Nature Magazine

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AUGUST-SEPTEMBER 1942

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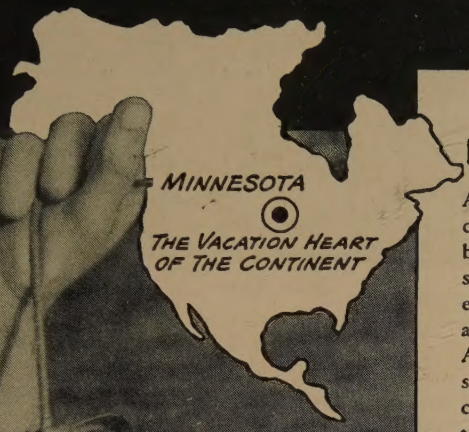

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Camera Trails

BY NORRIS W. HARKNESS

PASTORAL

Crop Records

The harvest season has begun, bringing opportunities for pictures that will include both lovely pictorials, and records of the crop and the events of its reaping. You may have often made pictorial shots of this kind, but have you thought of the record variety? You will be surprised at how helpful they can be.

Last spring I saw a group of pictures of the apple crop that had been presented to an expert pomologist for his comments. He looked over the twelve or fourteen prints and made two suggestions as to methods of handling the fruit, suggestions that resulted in saving money and delivering the crop in better condition.

Another casual shot of a wagon that carried the green corn to the silo helped a friend in another state to advise changes that materially lessened the work of loading. Still another resulted in the sale of the farm.

Suppose you are making pictures of haying. You will want shots of the empty barn, the wagons and any machinery that may be used. Then you will want the field before and after it is cut; the mower in action from several places in the field; the tedder and the loader or the rake, and, above all, the men at work. Their sweaty faces as they lift the heavy forks or drink from the jug will make excellent pictures, especially from a low camera angle and with a medium yellow filter to darken the sky and bring out the clouds. That same filter will make sunlit blond hair brighter and darken blue eyes without greatly affecting the skin tones.

We will have more to say about some special pictures later, but do not wait for the next Camera Trails. Get some of these crop pictures now. They are well worth shooting.

Fishing and Cameras

You like to go fishing, perhaps, but there are more exciting things than fish to be caught on a fishing trip if you take the camera along. And that is said by one who knows the thrill of bass or trout on a fly deep in the woods or along a clear brook, one who enjoys almost any kind of fishing wherever he can get it.

The last time I went with the gang to see how the bass were biting, an accident to one of the cars damaged my rod and for a moment I was a bit low in spirit. But the camera was not injured and for the first time in my life the big ones could not get away. The rest of the group came home with a few fish and a long string of alibis, but I got pictures that are still pleasing and happy reminders, as well as pictorial material. The truth of the matter is that I may leave the tackle at home next time and fish with camera and filter.

Fish pictures need patience. Somehow there is no cue that will get the bite or the strike just when you want it, and you will have to learn where the fish may bite just as well for the camera as for the rod and reel. Of course, you can always tie a small stone to the line and have the angler play it to make a realistic shot, but it will rarely have the excitement of the real thing unless he is a better actor than he probably is.

These pictures need the feeling of action and the camera location is perhaps the most important factor. Making the shot at the perfect moment is equally vital, but that needs a little less precision and speed when the action usually can be repeated two or three times. If you miss the most dramatic instant the first time, get it the next time the action moves to the right point.

A fishing trip makes a good series of pictures if it is planned ahead and the selection of the shots you want is almost automatic. Get the preparations for the trip, perhaps with one angler readying his outfit while others sit around and make comments. Then shoot the start of the journey showing the paraphernalia and the clothes of the group.

Show the assembly of the rods and the testing of the lines at the start of the fishing. Then pose a shot or two while you use a low camera position to show the angler against the sky. Watch out for trees that may interfere with the composition, but take a spotty background rather than a higher camera location, or one that gives the angler a flat lighting. Side lighting is vital for depth and excitement, although you will probably want one or two shots against the light with the sun hidden behind a convenient tree trunk or even behind the subject himself. A lenshood is a "must" to avoid the flat negatives that are caused by stray light hitting the lens directly.

Check the exposure carefully with your meter or calculator, and remember that these pictures are best when there is enough detail in the shadows to look natural. That calls for full exposure and the use of a small enough stop (wide enough aperture) to get the whole depth of the picture sharp. Fuzzy areas will not help. And watch out for dark backgrounds of trees spotted too brilliantly with sunlight filtering through higher ones. If they are even a little out of focus, they will be most unpleasant in the enlargement.

So when you are "on location" and ready to shoot, find a point on which you can take your position so that your subject has side lighting against an even background of either sky or clear sky. Settle on the exposure you will need using a high enough shutter speed to stop any expected action—$\frac{1}{50}$th second will usually do although $\frac{1}{100}$th may be safer—and focus sharply on your subject. Then forget the photographic technique and concentrate on the picture.

In most cases and for most action it will be best to keep the fisherman down toward one corner of the picture area and let his rod and line extend toward the opposite corner, but stay far enough away to get the rod in the negative if he moves backward a little. Then just wait until something happens.

Get the strike if you can and be sure not to miss the excitement in his face when the fish begins to run and when it nears the net. Probably the most perfect such picture would be from a close position showing his face and arm on one side and the fish and net at the other with the two near enough to each other to make one shot and not two.

But as I said before, patience is the prime virtue—patience and alert readiness to shoot at the psychological moment that makes the truly exciting picture. Fishing pictures are not hard to do if you plan them ahead and are ready for anything that happens, but they will be only a scramble if you simply go out and hope to shoot whatever may take place without any preparation. And just think of being able to enlarge the catch after you get it home!

The Question Corner

C.R.L., Windsor Locks, Conn., asks: "How should I calculate my exposures for Kodacolor and Kodachrome? Is the idea similar to black and white work or should I base my exposure on something beside the shadow areas?"

ANS.—The procedure is different. In black and white work it is the light in the shadows that determines the exposure since we need

just enough on the negatives to give detail in the darkest places, and the film can take care of the other extreme in almost all cases. Color film, however, has much less latitude than monochrome and the exposure is based on the light from the most important area no matter how it compares with the rest of the picture. To get the most pleasing effect it is usually best to light the subject more flatly than in black and white work, and then either use the exposure data given with the film or hold the meter close to the most interesting area. Ordinarily we might express the difference in technique for average subjects as exposing for the shadows in black and white and for the highlights for color with the realization that the brightness range must be small in the latter case.

F. D., Saranac, New York, says: "One of my friends uses a medium yellow filter and gets darker skies than I do although mine is an orange. We both use the same film and usually develop them together. What is the reason for the difference between these results and those that would normally be expected?"

ANS.—The normal expectation, as you suggest, is darker skies with the orange filter than with the yellow, but the actual color with any filter depends upon the exposure given. It would seem likely that the factor you use is higher than his in proportion to the densities of the filters: you allow a factor of four or five for the orange that might require only three while he calls the factor one and one-half for the yellow that might need three. It may also be that your basic exposure with no filter is higher than his.

The solution for both of you might be found by trying a series of exposures starting with the normal with no filter and making exposures with factors of two, three and four on the next films. Develop them alike and give the two normal negatives the same exposure on the same kind of paper in the same enlarger with, of course, the same development of the prints. Then check the color of the prints in sky and deepest shadow areas to determine whether there is any difference in the two basic exposure calculations. Similar comparative prints should tell by the detail in the shadows which filter factor is preferable. The least exposure that will yield sufficient shadow detail will give the maximum filter effect.

T. J. L., of Milwaukee, Wisconsin, has sent two negatives and prints from them. The negatives seem sharp (and print sharp in my enlarger) but the prints are rather soft and diffused. He asks what may cause the trouble.

ANS.—Vibration of the enlarger and a dirty lens are the most likely causes of softness when the lack of sharpness is even all over the print. Vibration gives a sort of double image and the dust or condensation on the lens a general fuzziness. From the negatives and your prints and mine, I believe the lens is dirty either on the outer surfaces or inside. Go over the elements that come apart easily with lens tissue and make sure they are clean. Then try another print and see if you are not all right. The enlarger lens must be as carefully cleaned as the one in the camera.

This and That

You have been looking for a way to use your camera directly in the war effort and here it is. It is a simple plan and one that needs no complicated registration or anything more than your own personal effort, and there is no need of special equipment or a rating as an expert portrait maker. It is the "Pictures From Home" plan started by *The New York Sun* in May.

The plan is simply this: you, as the amateur who has wanted to enlist his photography in our all-out war effort, go to some family that you know has a son or husband or father in his country's uniform; you photograph the home, the members of the family, and all the other things and people he would like to see today and give them contact prints or enlargements not bigger than 2½ x 3½, small enough to be mailed to him in an ordinary envelop and carried in his pocket; you give them the prints and they mail them when they next write him. Where he may be is none of your business. And that is all there is to it.

In making the prints for them you will be helping the family; in letting you do this definite war work with your camera, they will be helping you; in entering into the "Pictures From Home" Campaign you both will be helping the man in uniform and, therefore, helping to the Victory that lies ahead of us.

Look up that family and start the picture making today. Our fighters want those pictures.

Remember that this coming autumn is likely to see the supplies of new equipment reduced tremendously and those of films, chemicals, and paper cut to perhaps one-third of what has hitherto been manufactured. That calls for conservation of all our photographic supplies. Conservation means sensible use, not no use at all, and we should all be especially careful of exposures both in the camera and in the printing. Check your exposure methods as I have suggested before and always make test strips before making a whole-sheet print. See to it that the camera is clean and in good repair and work thoughtfully.

If you have stills or movies of foreign countries, the O.C.I. wants to see them. Colonel William J. Donovan, Coordinator of Information, has asked the Amateur Cinema League to collect still pictures and movie films that show such areas of foreign countries as may be valuable to our military forces and the League has prepared a questionnaire which they will send to you on request. If you have such pictures, write to the League and ask for the blank. Their address is 420 Lexington Avenue, New York City.

The 4th edition of the *Photo-Lab-Index* is now ready in two volumes containing 754 pages of data and definite instructions for nearly every part of the photographic process from the layout of the darkroom to toning and print finishing. Many pages of developing charts and film and filter data make up part of the *Index,* a volume that is needed by every serious photographer. It is published by Morgan and Lester, 100 East 42nd Street, New York City. Ask for a copy of their "Blueprint for Photography", but do not forget to mention NATURE MAGAZINE.

Willoughby's Inc., 110 West 32nd Street, New York City, have issued an "Exposure Record Book" with gummed sheets printed

(Continued on page 341)

Becomes Correspondent For Two Newspapers

"After graduating from N.I.A., I became news correspondent for the New Orleans States and the morning paper, the Times-Picayune. I received top space rates from both papers. I have already netted $175.57 and proved by actual experience that N.I.A. instruction is astoundingly efficient and accurate in charting the course of aspiring writers."—Mrs. D. B. Turnbull, 1914 Esplanade Ave., New Orleans, La.

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Have you ever tried?

Have you ever attempted even the least bit of training, under competent guidance?

Or have you been sitting back, as it is so easy to do, waiting for the day to come when you will awaken all of a sudden to the discovery, "I *am* a writer"?

If the latter course is the one of your choosing, you probably *never will write.* Lawyers must be law clerks. Doctors must be internes. Engineers must be draftsmen. We all know that, in our times, the egg does come before the chicken.

It is seldom that anyone becomes a writer until he (or she) has been writing for some time. That is why so many authors and writers spring up out of the newspaper business. The day-to-day necessity of writing—of gathering material about which to write—develops their talent, their insight, their background and their confidence as nothing else could.

That is why the Newspaper Institute of America bases its writing instruction on journalism—continuous writing—the training that has produced so many successful authors.

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Many people who should be writing become awe-struck by fabulous stories about millionaire authors. Therefore they give little thought to the $25, $50 and $100 or more that can often be earned for material that takes little time to write—stories, articles on business, hobbies, travels, sports, news items, human interest stories, civilian defense activities, war work, etc.—things that can easily be turned out in leisure hours, and often on the impulse of the moment.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

IN THIS ISSUE

Camera Trails ..... Norris W. Harkness 338
Contents Noted ..... R. W. W. 343
Drug Plants and War Strategy ..... Ruth and Edward Brecher 345
Bringing Bambi to the Screen ..... Janet Martin 350
The Cony's Challenge ..... James G. Linck 353
Nature's Imitation Bandits ..... Margaret E. Gross 356
Explorer (Poem) ..... Ruth L. F. Barnett 356
Insect Mysteries ..... Edwin Way Teale 357
Carmeleta, The Baboon Babe ..... Hugh and Zelta Davis 361
The Redwing ..... Edward A. Preble 365
Wing Windows ..... Edwin Way Teale 366
The Lotus 368
Nature in Print ..... Howard Zahniser 369
Forest of Tomorrow ..... Edward Fenton 370
The Woodpeckers ..... Grace Keir 372
Gourds Have Glamour ..... Andrew S. Wing 373
The Fate of Beargrass Creek ..... Tom Wallace 376
August-September Skies ..... Isabel M. Lewis 378
An Uncommon Flower from Mexico ..... Bertha McKee Dobie 380
Sweetbrier (Poem) ..... U. C. Deike 380
The School Page ..... E. Laurence Palmer 384
Under the Microscope ..... Julian D. Corrington 390

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CAMERA TRAILS

(Continued from page 339)

for all the necessary exposure and printing data. The sheets are to be pasted to negative envelopes for permanent record of all the facts. The book of 99 sheets sells for 25c. Mention NATURE MAGAZINE when you write.

Spotting prints to get rid of the blemishes caused by dust on the negative is made far easier by Spotone, the new dye spotting color that sinks into the emulsion and does not show even when the print is viewed in oblique light. Three bottles of Spotone—to match the color of your print—retail for $1.50 and hold enough to last a lifetime. It can be used equally well on negatives and prints. It, too, is distributed by Willoughby's.

Wabash Photolamp Corporation, 335 Carroll Street, Brooklyn, N. Y., have produced a new flash bulb for use with Kodacolor. To explain its use, Wabash has published a new data sheet, Bulletin No. 301, which will be sent on request to all Camera Trails readers. Mention C.T. when you ask for it.

American Bolex Company, through its mail order division at 155 East 44th Street, New York City, has issued a new catalog of motion picture equipment and general accessories. Ask for the Bolex Mail Order Bulletin.

Camera Trails is given space in NATURE MAGAZINE to help you make better pictures and get more fun from your photography. To aid further to those ends, Camera Trails conducts a question-answering service to help solve your camera problems. Address your communications to Norris W. Harkness, Camera Trails, 1214 Sixteenth Street, N.W., Washington, D.C.

Birds and Flowers

Bird and flower lovers will find two noteworthy articles of special interest to them in the 1942 edition of *The World Book*, the pioneer encyclopedia for young people which this year is celebrating its twenty-fifth anniversary.

In "Birds," George M. Sutton of Cornell University presents 72 species of birds, including every state bird in color. Rudyerd Boulton of the Field Museum of Natural History, Chicago, writes interestingly of the importance of birds, their economic value, their home life, flight and migrations. To encourage friendship with the birds, he also suggests how to study birds, how to attract them, and how to build bird houses. More than 150 illustrations enliven his 52-page article.

The comprehensive article on "Flowers" has sixteen color-plates (129 different species), by Mary Eaton, long associated with the New York Botanical Garden. Among the flowers she has painted, Miss Eaton includes every state flower and the provincial flowers adopted in Canada. E. J. Alexander, curator of the New York Botanical Garden, discusses wild flowers of mountain, meadow, woodland, plain, shore and swamp, as well as cultivated flowers of garden and hothouse. The influence of flowers in everyday life, the parts of a flower, how flowers make more flowers, classes of flowering plants, how to identify wild flowers, types of flowers to plant for various gardens, unusual flowers in North America and other parts of the world, flower arrangement and floral emblems and symbols are among the important features of the Alexander article.

Poems

Will of the Wind. By Guy Sheatz. Los Angeles. 1942. The Ward Ritchie Press. 99 pages.

This is a little book of collected poems by a young man now working in a war industry in the West. We know of him through one of his professors at an Ohio college as an individualist with a penetrating mind avidly interested in many things. This is reflected in his verses, which are sincere and sentient. We like particularly, as typical of this collection of poems, the one entitled "Science and Art":

"When mind grows weak of gazing on its wealth,
And sickens at the mass of garnered fact
Which promises no fresh untrodden tract.
When love and freedom, genius, beauty, health,
Are classified in bottles on the shelf.
When soul, psychologized to outward act
Is tailored like the clothes to fit the back
And gorged science cannot move itself.

Then, Art, pick up thy brush and boldly limn
A setting for each clue that points afar
Make each small mystery however dim
Outhue the spectrum of the brightest star.

Where thine intangible ray has found tenure
The intellect will follow slow but sure."

Plant Science

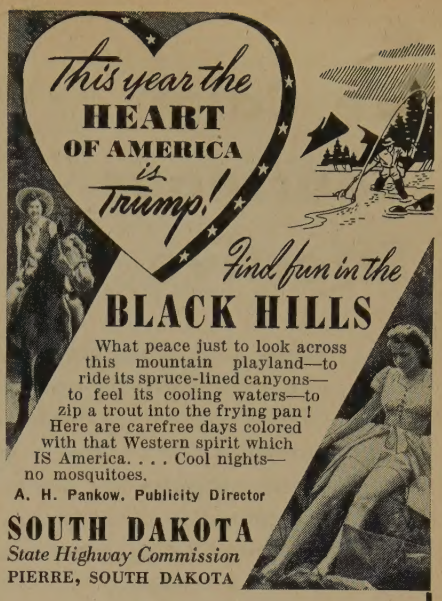
An Introduction to the Plant Sciences. By William C. Darrah. New York. 1942. John Wiley and Sons. 332 pages. Illustrated. $2.75.

This textbook, which is the result of six years of lectures in general botany given at Harvard University and Radcliffe College, is designed to satisfy the needs of the student taking a half-year or one semester course in botany or plant biology and planning no additional work in that field. In view of this specialized purpose, the author has in his text related the botanical sciences to such subjects as economics, history, anthropology and sociology, thus giving added significance and practical application to the subject under treatment. The result is an extremely interesting and readable treatment.

Fresh-water Fishes

Representative North American Fresh-water Fishes. By John T. Nichols. New York. 1942. Macmillan. 128 pages. Illustrated in color and black and white. $1.25.

This little pocket-size book is designed to provide identification and brief life history information on sixty of the representative fishes of the fresh waters of North America. Its author is Curator of Recent Fishes at the American Museum of Natural History, and the illustrations are by Andrew Janson. This is a valuable little book for the fisherman and for anyone interested in fishes.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"THE TELEPHONE HOUR"— *presenting great artists every Monday evening — N. B. C. Red Network.*

CONTENTS NOTED

IN a variety of publications that circulate only to relatively small groups; in publicity releases; in newspaper clippings and in letters, many items of interest come to the editor's desk. From there they progress into the files, the editor's store of knowledge, or the wastebasket. Much of this information is of no tremendous general consequence, but often it is touched with humor or pathos; is provocative of thought or to be classified as useless information of transitory interest. On this page we will pass on some of these items, under no illusion in so doing that we are contributing anything imperishable, but in the hope that they may be entertaining—possibly even informative.

MBONGO, famous mountain gorilla of the San Diego Zoo, has gone to ape Valhalla, victim of San Joaquin disease. This is an affliction of the lungs induced by a fungus that originates in dust, or in the soil, and acts like pneumonia. Mbongo, a definite anthropoid personality, was about five years old when he joined the zoo entourage in 1931, and weighed 122 pounds. At sixteen he jiggled (sic) the scales at between 645 and 670, and had a waist measurement of six feet and an arm length of forty-eight inches. He has been given over to the taxidermists to preserve the memory, at least, of a great ape.

HIROHITO might just as well give up, according to United China Relief, which has recently been given a Chinese Everlasting Lily with one full bloom and a bud. This, we learn, spells the setting of the Rising Sun. It seems that this lily produces a flower only once in every forty or fifty years. Furthermore, it is said that only one in some ten thousand ever blooms. When such an event takes place it is a moment of high good luck, an occasion for family celebration because the good fortune extends even unto aunts, uncles and cousins. It does not extend to the little Nipponese brothers.

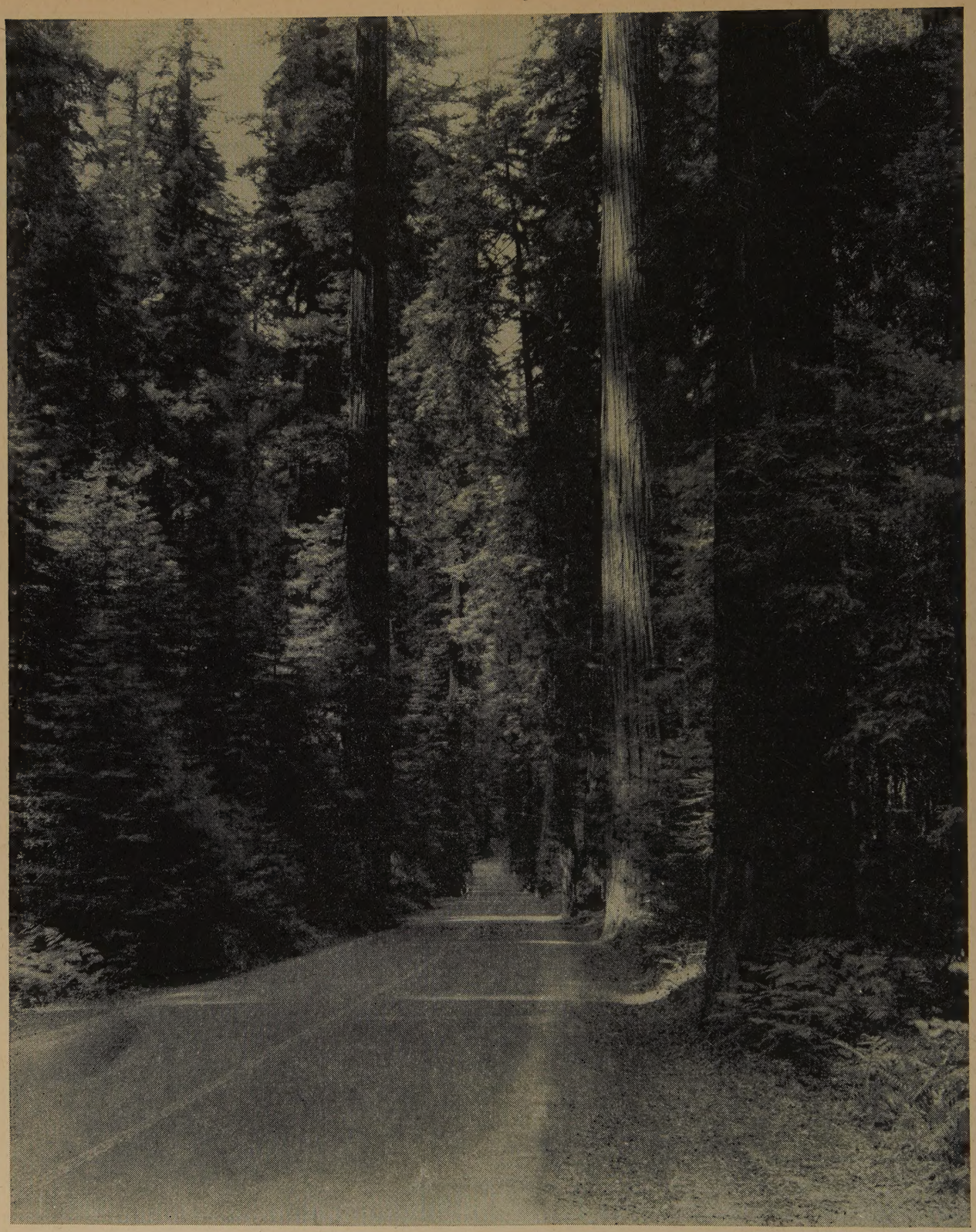
BY this time many of our movie-going readers may have seen, between the parts of the double-feature program, a Paramount color short on hybridization of roses. It was made at the Jackson and Perkins nurseries, where two thousand acres of roses bloom, and shows the painstaking process involved. While the motion picture is able to expand vastly on the limitations of the theater, its few fleeting moments of color devoted to the work of the hybridist seem too few. Years of experiment are involved. Two roses may be cross-pollenized to transfer fragrance, color or other characteristics. Then seedlings of the new seed are grown in the greenhouse. Graftings are made and field trials run under varied conditions. From these emerge a new rose, perhaps, while many failures go into the compost pile. A few moments on the screen seem to us to fail to express the true facts; to be super-condensation in an age already alarming in this direction.

SADIE, Reuben and Oscar toil for the Western Electric Company, which has long advocated a policy of "the right man for the right job." The personnel department lived up to this philosophy in acquiring the services of this trio. They are goldfishes whose assignment is to eat the minute algae that otherwise would cloud the windows of a testing tank. This tank, in some way we do not understand, is used to check sample solutions of the cellulose acetate that goes into switchboard lamp filament supports. Before Sadie, Reuben and Oscar got their social security numbers the lamp filament support situation was, we gather, fraught. However, these three go for the algae like Lucius Beebe for caviar, and all is now well at Western Electric.

A FASHION note from the Field Museum of Natural History reports the popularity of fish-skin clothing among the native tribes of eastern Siberia. The scaly hides of large fishes, including carp, salmon and trout, are given treatment that makes them nearly as flexible as cloth. When they are fashioned into outfits for ceremonial and other special purposes they are given special ornamentation. This consists of bits of dyed fish skin sewed on cloth and then attached to the garments. We call all this to the attention of *Women's Wear Daily* for what it is worth.

GRUBBING in the ground deep in the heart of the Big Bend region of Texas, Dr. Barnum Brown of the American Museum of Natural History unearthed parts of the skull of a prehistoric crocodile. The Museum's preparator chiseled and polished for eight months to get at the broken sections of the skull and jaw, which were embedded in hard stone. The result is the six-foot skull of an ancient contemporary of duck-billed, horned and armor-plated dinosaurs. Paleontologists give this reptile of seventy million years ago a length of more than forty-five feet and the name *"Phoboschus."* An Asiatic marine crocodile that sometimes manages to grow to thirty-three feet is its nearest living rival. "Phobo's" skull is now displayed at the Museum.

R. W. W.



PHOTOGRAPH BY GABRIEL MOULIN

"The Avenue of the Giants" in the redwoods near Dyerville, Humboldt County, California. These trees have been preserved as a part of the State Park system. Immediately adjacent, however, are more great trees along this highway now threatened by the lumberman's axe. The Save-the-Redwoods League is moving to save these trees, and the State of California will meet, dollar for dollar, private contributions to that end.

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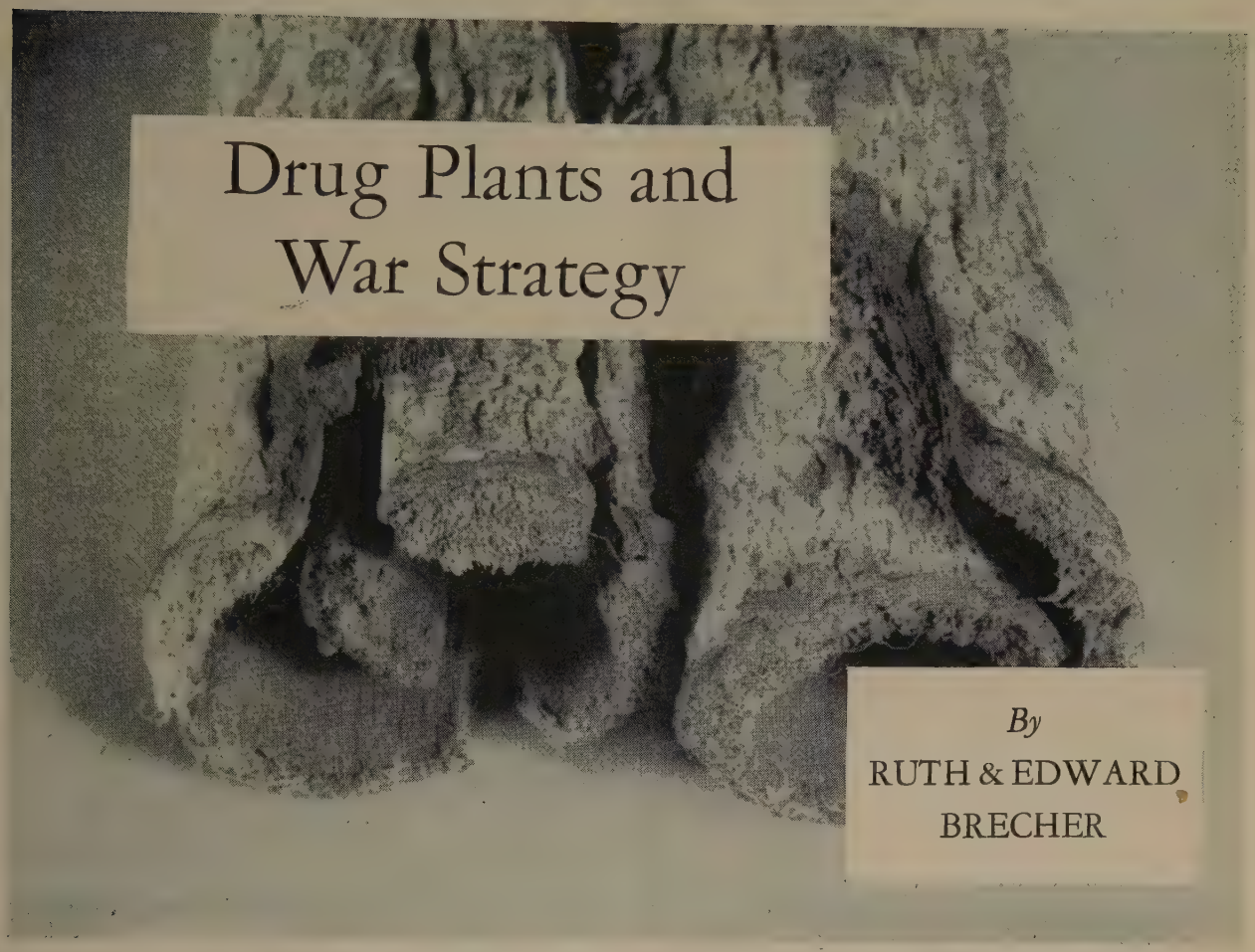
Drug Plants and War Strategy

By
RUTH & EDWARD BRECHER



THE BARK OF THE CINCHONA TREE FROM WHICH QUININE IS DERIVED. PHOTOGRAPH FROM BLACK STAR.

AT INTERVALS, the Army and Navy Munitions Board issues a list of the strategic and critical materials deemed essential to the war effort, including aluminum, rubber, tin, and many more. But sandwiched in among these obvious military indispensables are such apparently unwarlike products as the bitter red bark of a South American evergreen, a chemical element found in brine pumped from abandoned oil wells, and the coagulated juice of an oriental flower. For quinine, iodine, opium, and other medicinal drugs of natural origin, commonly procurable at any corner pharmacy, have now become factors in the high strategy of the United Nations—and of the Axis powers.

The first principle of American drug strategy is to ensure adequate supplies of these medicines for ourselves, our Lend-Lease allies, and our benevolent neutrals. The second principle is to keep supplies out of the hands of our enemies. But occasionally strategy goes even further.

Thus in certain of the occupied countries of Europe, anti-Axis revolutionaries make it their business to collect important medicinal herbs. These secretly-collected drugs pass from hand to hand along a sort of underground railway across the continent of Europe—sometimes hidden under cabbages and turnips at the bottom of farm carts, sometimes camouflaged as common garden produce. Eventually they reach points accessible to Allied ships or planes. The United Nations' drug supply is thereby increased; the Axis supply is curtailed; and the European revolution procures additional funds for its anti-Axis activities.

Our drug supply does not, of course, depend upon such midnight forage. Months before our entry into the war, the U. S. Treasury had begun to accumulate strategic drug stockpiles. The Department of Agriculture had prepared plans and grown seeds for domestic drug production. The Office of the Coordinator of Inter-American Affairs and private interests were exploring Latin American drug resources. Scientists throughout the country were at work

CINCHONA BARK DRYING IN DUTCH EAST INDIES SUN. THIS SOURCE OF SUPPLY NOW CUT OFF, WE MUST TURN ELSEWHERE. PHOTOGRAPH FROM WIDE WORLD.

on processes for synthetic drug manufacture. As a result of these and similar lines of attack, there will be no repeat performance of the drug famine that afflicted us in World War I.

The President calls our war against the Axis a war of survival. For centuries, however, man has been waging another war of survival—a war against the one-celled parasite *Plasmodium* which, entering the human blood stream through the bite of the *Anopheles* mosquito, turns the strongest men into malaria-wracked invalids. The most widespread of all diseases, malaria annually afflicts some three to five million sufferers in the United States, and eighty to one hundred million in India.

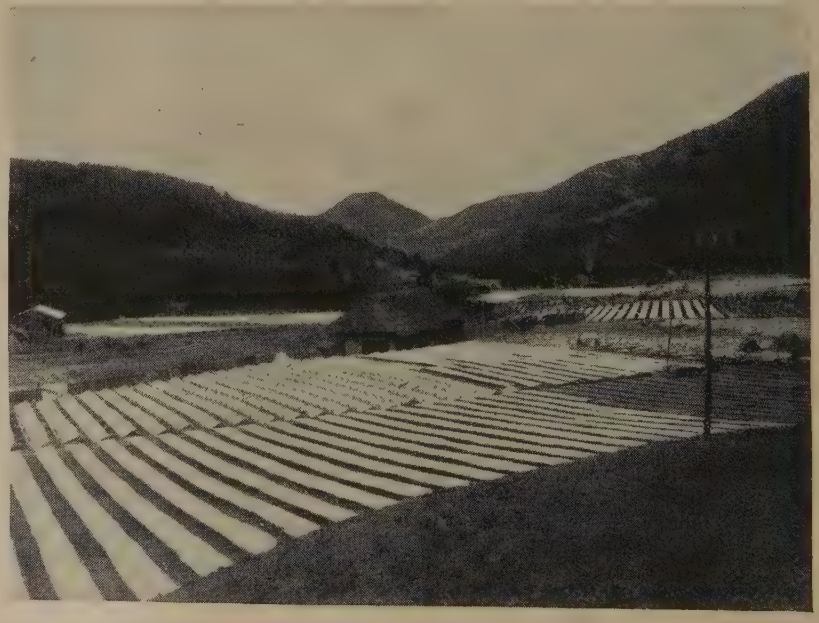
For an approximation of the malaria belt, mark out on the globe a belt around the equator extending a third of the way to either pole. Now spot the chief battlefields of Democracy's war against the Axis. Except on the Russian front, the bulk of the fighting is in areas where war must simultaneously be waged against *Plasmodium malariae*, one of several species of *Plasmodia*.

Quinine is the gunpowder of the war against malaria. Everywhere in the tropics, soldiers must have their daily prophylactic dose of quinine to keep them well, and larger doses to cure them if the mosquito-borne malaria parasite penetrates this first line of defense. Soldiers in the Philippines learned what happens when quinine is lacking. After the supply in Bataan gave out, 80 percent of the peninsula's defenders fell ill with the intermittent aches and chills and fevers of malaria. The inevitable surrender followed.

Originally quinine came from South America. According to persistent legend, in the 1630's the Countess of Chinchon, wife of the Spanish Viceroy of Peru, was cured of malaria by an Indian tea brewed from the bark of a tree which was called cinchona in her honor. This tale has, very recently, been questioned in some details by research into quinine's medical history. However, the Jesuits carried "Countess's bark," "Jesuit's bark," or "quinaquina"—Indian for "bark of barks"—all over malaria-ridden Europe.

Had South America remained the source of the world's supply of cinchona bark, our present procurement task would be easy. But as a result of several factors South American production long ago declined. One cause was a dearth of trees. As the world demand increased during the 18th and 19th centuries, more and more cinchona trees were cut down and stripped of their bark. Few new trees were planted. With Nature's balance thus destroyed, a world-wide shortage threatened.

Foresighted European governments, motivated no doubt by rising prices, long ago sought to secure cinchona seeds or saplings to plant elsewhere, but without success. As early as 1735, a French expedition managed to transport a cargo of young plants 2000 miles down the Amazon,



AGAR-AGAR IS ALSO BLEACHED IN THE SUN, AS IN THIS PICTURE IN JAPAN. FOR THIS PRODUCT, TOO, WE MUST SEEK OTHER SOURCES. PHOTOGRAPH FROM S. B. PENICK AND COMPANY

only to lose them in a storm and shipwreck at the river's mouth. The botanist of that expedition spent the next fifteen years in isolated mountain outposts studying cinchona and gathering specimens, only to be robbed on his way home. Loss of the fruit of his long labors drove him mad.

The few who successfully procured live cinchona and planted it elsewhere found to their dismay that the tree languished in foreign soil, fell prey to disease and insect pests, or after years of tedious cultivation yielded only negligible amounts of the anti-malarial drug. It was not hard to believe the Quichuan Indian legend that a curse assailed those who exported cinchona alive.

Not until 1865 was the jinx evaded. Then the English explorer Charles Ledger procured, through the connivance of a native servant, a few pounds of cinchona seed of a variety especially rich in quinine. Outraged Indians murdered the unlucky servant; but Ledger escaped and sold the seeds to the Dutch government.

Dutch agricultural experts made the most of Ledger's acquisition. By careful selection and hybridization, by budding drug-rich stalks on sturdy, disease-resistant roots, and by other applications of scientific agriculture, they developed a bark yielding many times as much quinine as the wild South American species. Noting that the bark on the shady side of the tree is richer in quinine than on the sunny side, the Dutch plastered the trunks with moss to keep out the sun, thus doubling or trebling the yield.

In 1914 the Dutch *Kina-Bureau* achieved a world quinine monopoly. To avoid competition, it bought up whatever bark appeared on the South American market; and it sold quinine through national quinine monopolies in the various countries. But the quinine monopoly is Dutch no longer. For the Dutch cinchona plantations, producing 95 percent of the world's supply, are located in Java, and are now in the hands of the Japanese.

DIGITALIS PLANT IN FLOWER AND BELLADONNA PLANTS "HARDENING OFF" IN COLD FRAME UNTIL THEY ARE AS LARGE AS IN THE INSET AND READY FOR TRANSPLANTING. BUREAU OF PLANT INDUSTRY AND S. B. PENICK PHOTOGRAPHS.

Had the fall of Java caught us napping, all vital bases within the malaria belt might now be closed to the United Nations. But some Americans were wide awake. As a result, we now have at least four sources of ammunition against the dread malaria.

As early as 1939, the government began to buy quinine in large quantities, and continued to buy until the fall of Batavia. Thus we have on hand a stockpile sufficient at least for present needs. To conserve it, the War Production Board has frozen stocks of quinine intended for hair-tonics, hangover remedies, and other non-malarial preparations. The government stockpile, guarded by the U. S. Treasury as carefully as it guards its gold, affords us precious time in which to develop other sources of supply.

With the Java plantations cut off, South America's turn has come again. Re-exploration of its less accessible mountain regions, undertaken by the Board of Economic Warfare, the Office of the Coordinator of Inter-American Affairs, and private interests, has located along the eastern slopes of the southern Andes large areas in several countries where cinchonas still grow wild. Estimates of the bark available vary, and getting it out is no easy task. But the obstacles are not insuperable. Wild South American bark can be brought again to market—in time to help us win the war.

To balance that harvesting of the standing cinchona reserve, new groves can be planted. Improved varieties may be introduced from the U. S. experimental cinchona groves in Puerto Rico, and from the Department of Agriculture's stock of shoots and saplings. Scientific cultivation and harvest techniques thus may be employed. If this is done, South America can compete on

an equal footing with the Java plantations as soon as the new groves reach maturity.

But cinchona trees take seven long years to mature, and our war needs will not wait. Can we steal a lap on Nature?

The Russians say yes. They have developed a technique for cultivating cinchona in nurseries, and harvesting during the third year. One American company believes that it can even go the Russians one better and harvest toward the end of the second year. Such nurseries, located in suitable Latin American areas, may be in production by 1944.

Faced with a possible shortage of cinchona, malaria fighters are introducing a way to make one pound of bark do the work of four or five. They are substituting for the pure white crystals of quinine a product called totaquine, which contains, in addition to quinine, other anti-malarial components.

This is the third in the series of articles prepared specially for Nature Magazine and emphasizing the vital rôle that Nature plays in war. This and the two previous articles on rubber and strategic metals point out the vital need of cooperation with Nature in developing and conserving sources of supply. Thus we may remove dependence upon parts of the world that may be cut off by forces of aggression as they are today.

Cinchona bark, chemists have long known, yields quinidine, cinchonine, cinchonidine, and other alkaloids as well as quinine. To separate out the quinine requires a series of complicated chemical maneuvers. In a few countries, notably India and the Philippines, the cheaper totaquine, which consists of the unseparated alkaloids, has been widely marketed. Now pharmaceutical researchers have found that the once-scorned totaquine, when combined with enough quinine sulfate, is as potent against malaria as quinine itself, and the drug has been official since June, 1942. This change to totaquine can increase the anti-malarial effectiveness of the available cinchona bark.

Totaquine is especially important to South America. Most South American bark is poor in quinine, but rich in the other alkaloids, and hence an excellent source of totaquine. The same is true of nursery cinchona bark harvested before maturity.

Meanwhile the chemists, hard on the heels of the botanists, have developed synthetic ammunition against *Plasmodium* to supplement the natural drug.

Best known of the synthetics is atabrine (quinacrine hydrochlorate) developed from a yellow coal-tar dye years ago by I. G. Farbenindustrie, the German chemical trust. Atabrine has long been marketed here, though only in small quantities, through a company affiliated with I. G. Farbenindustrie, and licensed under its patents. Since our entry into the war, some steps have been taken to eliminate patent and other restraints on atabrine manufacture in this country. While this synthetic may have some disadvantages as compared with the natural drug, it is a potent weapon on the malarial front.

A second synthetic, plasmochine (pamaquine naphthoete), has similarly been subject to German restraints. Plasmochine is an important auxiliary drug, administered in conjunction with either quinine or atabrine. If artificial restraints are removed, both atabrine and plasmochine can be manufactured here in any quantities desired.

On the horizon, or just beyond, lurk two additional synthetic possibilities. One is man-made quinine, already reported to be produced experimentally in small quantities. When, and if, an economically feasible process for large-scale manufacture is developed, our reliance upon cinchona bark may abruptly end.

That possibility is now being explored, and so is the possibility of using against malaria certain new synthetic drugs, including relatives of sulfanilamide.

No one is bold enough to say that we have yet got the malarial drug problem licked. But at least, thanks to stockpiles, South American sources, totaquine, and, perhaps, synthetics, the problem does not have us licked.

To physicians, the purple crystalline element iodine is a jack-of-all-trades. It is administered in minute doses for diseases ranging from arthritis and arteriosclerosis through goiter to syphilis. But its major use is as a skin-permeating antiseptic; and as such it is a battlefield essential.

Iodine is present in almost everything, but in quantities too infinitesimal for successful recovery. Because iodine compounds are water-soluble, most of the element on this planet has long since been washed into the oceans. There it is concentrated in seaweed—especially kelp, from which it is sometimes extracted commercially—and in other marine life.

Only in the Chilean nitrate deposits, high up along the dry western slopes of the Andes, are solid iodine compounds found in quantity. The rainfall there is too scanty to wash them away. Chilean nitrate producers derive iodine as a by-product when purifying their sodium nitrate, and have long supplied the bulk of the world demand.

Germany, now cut off from Chile, is said to be reclaiming used iodine from discarded swabs and bandage pads. Not so the United States. Even in the unlikely event that transportation from Chile were disrupted, our domestic iodine resources would be adequate. One American chemical company now extracts a variety of chemicals from the treasure-laden brine found in abandoned oil wells; and among its products is iodine. More recently this company has begun to get the related element bromine, and incidentally iodine as well, in commercial quantities directly from the ocean.

That is quite an achievement, for it takes more than a thousand tons of sea water to yield an ounce of iodine. But there is no danger that the raw material for this process will be exhausted. The ocean still contains an estimated 60 billion tons of iodine—enough to dab on our cuts and bruises for a long time to come.

With respect to agar-agar, a gelatinous substance taken from certain kinds of marine algae which grow chiefly off the coast of Asia, our situation is not quite so fortunate. Heretofore, Japanese fishermen harvested *Gelidium corneum*, extracted the agar-agar, and exported it by the ton all over the world. Pearl Harbor ended that.

The widest use of agar-agar is as a bulking agent in

laxatives; and if this were its only use, substitutes could readily be found. But certain types of disease germs are finicky in their tastes. They will accept no substitutes for agar-agar as an ingredient in the culture media on which they are grown in biological laboratories. Accordingly, the seaweed extract is indispensable when germs are cultured for the diagnosis of disease and for the testing of biological preparations. The Army Medical Corps alone requires considerable quantities.

It will get what it needs, thanks to one Detroit biological firm. Anticipating the possibility of a future shortage, this company has for many years paid double the Japanese price for agar-agar from California in order to keep the industry there alive. As a result, California algae beds near Glendale can now produce enough agar-agar to fill both military and civilian biological requirements.

During World War I, the U. S. suffered from shortages of two long lists of drugs—one a list of synthetics theretofore imported from Germany, and the other a list of medicinal herbs and plants previously procured from various parts of Europe. This time we have a synthetic drug industry of our own, and we have learned to synthesize a variety of drugs formerly derived from natural sources. Some medicinal herbs still deemed essential grow wild in abundance, and need only be collected.

FLOWERING TOPS OF A SECOND YEAR'S GROWTH OF THE VALUABLE DRUG PLANT, HENBANE. PHOTOGRAPH FROM THE U. S. BUREAU OF PLANT INDUSTRY.

There is no need now for the drug patches that sprouted in backyards and roadside strips a quarter of a century ago. Only a few important drugs must be cultivated, and for these the Department of Agriculture has devised plans far superior to the haphazard drug projects of 1917-1918.

Best example of the Department's drug-planning is the belladonna plant, once used by Italian ladies of fashion to make their eye-pupils large and lustrous. Today belladonna has more essential uses. Its active principle, atropine, is the physician's and surgeon's emergency drug, injected for shock or collapse, and hence of especial military significance.

Most belladonna has long come from central Europe; and when the European drug became unavailable during World War I, prices soared dizzily. American farmers rushed to grow it, but turned to more profitable crops when the Armistice brought a collapse of the belladonna market, which could absorb only a fraction of the supply.

Last year another belladonna famine seemed to threaten, and for a time speculators drove the price of seed to $25 an ounce. But experts in the Division of Drug and Related Plants in the Department of Agriculture's Bureau of Plant Industry, remembering 1917, had been forehanded. For more than two decades they had grown each year a 30-foot row of belladonna plants, also called deadly nightshade, on the experimental farm at Beltsville, Maryland. In 1941, they seeded a larger plot from that row; and last fall, from a third of an acre, they harvested enough seed to grow this year belladonna to supply all the needs of the United Nations if a fair yield is obtained.

The disposition of that seed is a model of wartime strategy. On a map of the United States, drug tacticians of the Department of Agriculture and experienced men from the botanical drug industry spotted the areas where soil and climate are suited to belladonna culture. Within those areas, they chose locations near or on tobacco farms; for belladonna must be dried and processed somewhat like tobacco. To farms suitably located, belladonna seeds were distributed free of charge, subject only to the condition that they be nurtured with as much care as any other vital war resource.

A large botanical drug house sent its field production manager, accompanied by Government technicians, to the several selected localities and the seeds were distributed along with information concerning cold-frame forcing, field planting, warding off insect pests, harvesting, curing and bagging or baling for market. This drug house, realizing the farmers' need of industry's support, hired more than 200 growers to cultivate belladonna, and this firm took complete responsibility for the outcome of the crop. To date it has paid out to these growers almost $100,000 without any kind of insurance or guarantee that a successful crop will be produced. This project represents probably 75 to 80 percent of the belladonna being cultivated in the United States, and, to help protect the national supply from local crop failure, the belladonna sites have been scattered over five States—Pennsylvania, Wisconsin, Ohio, Tennessee and Virginia. The crop now under cultivation is enough for an average year's needs—plus a 100 percent margin of safety. (Continued on page 381)

LITTLE BAMBI SEEKS THE LOW-DOWN ON LIFE FROM HIS GENTLE MOTHER

Months of study of animal habits and actions were necessary in—

Bringing Bambi to the Screen

By JANET MARTIN

WHAT does a rabbit act like when he gets twitterpated in the springtime? What is the difference in personality between a squirrel and a chipmunk? Exactly what emotions does a young buck have when he sees his chosen mate being lured away by a rival?

Knowing the ins and outs of such matters is the task of the artists in Walt Disney's studios. How much these talented men have to know about our animal friends is vividly illustrated in Disney's latest full-length picture based on Felix Salten's memorable romance of the forest, *Bambi.* Although animals have always been an important part of the charm of Disney films, the producer himself feels that the animals of *Bambi* represent the highest achievement of his staff.

Somehow all Disney animators seem naturally to like animals. Dogs, cats, rabbits, pigeons, tame squirrels and chipmunks, and even a "defrosted" skunk or two are private possessions of staff members. Because they do like animals, and because, as artists, they are naturally observing, they have a solid foundation of knowledge of the primary mannerisms and personalities of many birds and mammals. Anyone who has ever had a pet knows that it has an entirely distinctive personality to its owner. Disney-created animal characters also have personalities to the men who draw them.

The story of how Disney's artists created the vital animal personalities in *Bambi,* the life story of a deer and his forest neighbors, goes back five years. All who have read this outstanding story know that love, hate, fear, romance and tenderness weave a pattern in its progress.

When these artists knew they were going to be assigned to work on *Bambi,* the first thing they did was to familiarize themselves with the characters and the story. Besides Bambi himself, his doe Faline, his mother, his father—the great prince of the forest—and a few other deer, they found they would be drawing rabbits, squirrels, chipmunks, moles, beavers, skunks, and many kinds of birds from owls to wren tits.

This started a period covering almost two years, in which the artists studied live counterparts of their characters, and movies of animals in action. They visited not only zoos but national parks, where they made hundreds of sketches and took thousands of pictures of animals in their native habitats.

Although these men were all included in the cream of Walt Disney's talent, they started attending special

art classes, several nights a week, for more than a year. There Rico Le Brun —one of the world's best draughtsmen and animal artists—taught them animal anatomy.

Although these men had been drawing animals for Disney pictures for quite a few years, their problem in *Bambi* was as different from their usual work as day is from night. It was no trick for them to draw a furry bunny or a squirrel, or any other animal with a fairly bushy coat. But it was a different problem to create a realistic deer.

When deer move, it is possible to see practically every bone and muscle. There could be no "cheating" in the creation of Bambi and his friends. One misplaced anatomical feature, no matter how slight, and the deer would look unreal and fantastic. This could not be allowed to happen, for Bambi and the other deer had to be done so realistically that the audience would think of them as real live personalities. Otherwise one could not hope to instill the story's strong emotional elements into the picture and give them credibility.

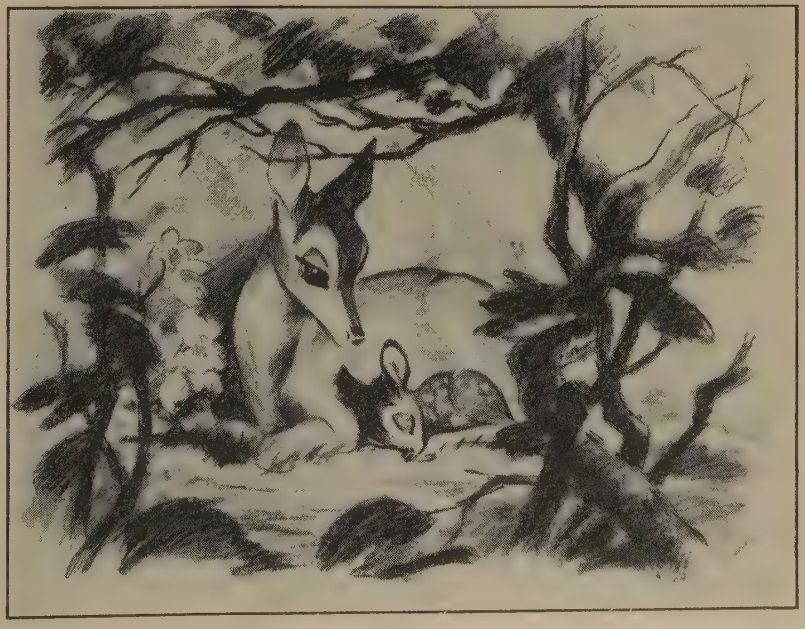
The artists were also helped in their creation of the deer characters by two live models, sent to Walt by the State of Maine. These deer came to the studio as little fawns, and grew to adulthood under the watchful eyes and cameras of the Disney staff.

After the artists had thorough grounding in the realistic drawing of their animal characters, it was time for

LITTLE THUMPER PROVIDES A NEW DISNEY PERSONALITY AND MANY LAUGHS AS BAMBI'S FRIEND IN THE FILM VERSION OF FELIX SALTEN'S ROMANCE OF THE WILD.

"YA DIDN'T HOP FAR 'NUFF" EXPLAINS THUMPER WHEN BAMBI FAILS TO CLEAR THE LOG THAT BARRED THEIR WOODLAND PATH.

"BAMBI"—BOOK AND FILM—BOTH ARE A STORY OF TOTAL LOVE, A ROMANCE OF THE WOODLAND THAT HAS TAKEN ITS PLACE AMONG THE GREAT BOOKS. TO THIS WORK WALT DISNEY HAS DEVOTED ALL HIS TALENTS AND THOSE OF HIS STAFF TO MAKE ANIMALS LIVE IN A TECHNICOLOR FILM.



them to turn to personality studies of the *Bambi* characters. What was Bambi like? Was he bold, timid, adventurous, assured, playful, morose? What was Faline like? Was she poised, coy, flirtatious, reserved? Was Thumper, the rabbit, the forest's version of the life of the party? Did he have innate dignity, or was he a clown? Would he keep his head or get rattled?

From thorough study of live animals, from talks with the men who created the Disney adaptation of the story, with the directors, with the production supervisor, and with Walt himself, and from looking at the thousands of character models and mood sketches created by others of their artist co-workers, the animators found their minds crystallizing the individualities of the *Bambi* characters. They came to know Bambi, Faline, Thumper, Old Friend Owl, Flower the Skunk and all the rest as well as they knew their next door neighbors. All this took place before they ever set pencil to paper!

FALINE, THE CHARMING DOE, TRIES HER WILES ON BAMBI

And by the time animation actually began, some of the most difficult hurdles were already cleared.

Nobody is ever conscious of how much he uses his arms until he has one in a sling. By the same token, the artists who were assigned to deer animation never realized how much they depended on an animal's various bodily gestures for personality touches until they had to animate deer.

From their long studies in animal anatomy, they knew that the only leeway they would have in making a deer go through visible changes of moods and expression was in the matter of ears, eyes, tail, and, on rare occasions, the slight turn or lift of a shoulder. With rabbits, skunks and other compact little creatures, they could have them use their paws for gesturing, and their whole bodies for accents to dialogue, but the anatomical construction of deer made such devices impossible. The warm and striking personalities given the deer characters in *Bambi* are vivid proof of how well Disney's artists succeeded in doing a difficult job.

It is a well-known fact at Disney's that a man has to love an animal thoroughly before he can draw it well. One of the animators in the studio, for example, was assigned to do some animation on the two skunk characters in *Bambi*. These characters, incidentally, are two of the most lovable and appealing in the entire picture. This man, however, could see nothing lovable in skunks—and his work showed it.

"What's the matter, Slats?" Walt asked this artist one day. "You seem to be having trouble getting cute personality stuff into your skunk scenes."

"I know it, Walt," the artist broke down, "but I just don't especially like skunks!"

This artist was taken off the scenes and put into another picture where he had to draw another type of character. He and the new character were perfectly *en rapport*.

The artists also find that after they know the personality of a character they are drawing, it is actually difficult to draw him out of character. Many animators, having difficulty with a piece of action, suddenly discover that they are asking the character to do something that is not natural to him.

There is an unwritten code around the Disney studio that no bird or animal must ever be hurt or abused in a Disney film. Of course, there have been a few exceptions, such as the dinosaurs in *Fantasia*, but nobody seemed to feel the same toward them as they do toward the more commonly known wild and domestic creatures of today.

Disney himself has never killed a bird or an animal in his life, with one unfortunate exception. One day, when he was a little boy about eight, he surprised an owl sleeping in the low branch of a tree. He sneaked up behind it and grabbed it. The owl, surprised and frightened, began to claw and fight, and beat its wings.

Little Walt, equally startled and frightened, let go of the owl and, in his hysteria, stamped on it. Even years later he had recurring nightmares about this incident. Even now when he tells about it he shudders. Perhaps Walt has squared himself with that owl by his heartwarming delineation of kindly Old Friend Owl, one of the leading *Bambi* figures. Anyway, Walt fervently hopes so.

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Bird songs are tone blossoms—flowers strewn upon the wind. —HARRIET GREENLEY

DARLENE SURVEYS THE SCENE ABOUT HER ROCKY DOMAIN AT NEWBERRY CRATER, OREGON.

It takes patience such as Job never possessed to accept and meet—

The Cony's Challenge

Photographs copyrighted by the Author

By JAMES G. LINCK

THERE WAS no reason to doubt Henry (Hank) Gordon. He was by instinct, experience and preference a naturalist—a stickler for factual and sometimes tiresome detail. We were discussing wild animal photography when he asserted that authentic photographs of the wild North American cony were evidently nonexistent. Of course, I believed him.

After deliberating a moment, Hank said, "Young man, you have shot some excellent animal photos." That, admittedly, left me wide open, modesty notwithstanding. Then, "I'll wager a good jack-knife you can't produce a bona fide photo of a wild cony in the wild—in the wild."

Because I'm a sucker for a lure of that sort, I struck the bait. "You made a bet!" I exclaimed impulsively. Little did I know! Truth is, there appeared to be no excuse for ignoring the challenge. He knew that I had ample time and wanted to retain his good opinion. So I was in for it.

Parleys were held. I conferred with naturalists. The consensus was: "The cony is the most timid wild animal in North America, and the most difficult to photograph." Libraries in San Diego, Los Angeles, San Francisco and Portland failed to reveal a single cony photograph. Pages of factual data and description there were, but no pictorial evidence. It appeared that conies were elusive.

THIS RECORDS A MOMENT FOR WHICH THE AUTHOR AND PHOTOGRAPHER WAITED MANY PATIENT WEEKS. THE LITTLE CONY PUTS A TENTATIVE PAW IN HIS HAND WHILE HE OPERATES THE CAMERA WITH THE OTHER HAND TO RECORD THE EVENT.

The North American cony, I found, belongs to the genus *Ochotona*. Coney, Little Chief Hare, Pika, as it is variously called, is a mammal about the size of a small guinea pig, six or seven inches in length. Some naturalists classify it as a tailless mammal, due to the absence of any external trace of a tail. Others meticulously say that the tail is rudimentary, 2/5 to 3/5 inches long.

Except for its short rounded ears, its structure places the cony in the same order as the rabbits and hares. Various species and subspecies differ but slightly. All resemble pygmy rabbits. The cony never assumes the erect posture common with rabbits. The short fore and hind legs are of nearly equal length; soles of the feet are lined with coarse hair; movements are utterly noiseless.

One of the outstanding differences from all other mammals is their possession, along with the hares and rabbits, of a double set of upper incisors, the second set being like little pegs and situated immediately behind the functional pair. Upperparts of the cony are covered with a long and fluffy coat of grayish-brown fur; while the underparts are gray tinged with yellow. Feet are white. Sexes are colored alike. Two annual molts occur. Although the cony's fur is soft, thick and of rich color, the pelt is far too delicate for commercial use. Miss Hollywood's "Cony" coat is a gorgeous fur creation, but—confidentially—it is rabbit.

The cony's call is a slow *"eamp, eamp,"* sounding like the bleating of a tiny lamb. The call is repeated at varying intervals, and with a force and energy expressive of alarm, inquiry, or excitement. Occasionally the *"eamp"* will rapidly accelerate, resulting in a trill. Calls are uttered through slightly-parted lips and have a ventriloquial quality that makes it difficult to locate the animals. Calls may be uttered day or night, and from far underground or on the surface.

The cony dwells in igneous rock slides and volcanic rock masses on the peaks of our western mountains from California and New Mexico to Alaska. While his ordinary range extends from 5000 feet to 9000 feet above sea-level, it is not unusual to find him happy and contented up to 13,000 feet and in a few places as low as 900 feet.

His home is deep underneath the rocks, blanketed with deep snow in winter. Oddly enough, this remarkable mammal does not hibernate. He has his three square meals each winter day because he "planned it that way," adequate sustenance in the form of "hay" having been stored within his burrows.

THERE'S THAT MAN AGAIN. PERHAPS THE CONY WONDERED WHY HE WAS SO PERSISTENT IN HANGING AROUND THE ROCKS.

On many days throughout the summer, the cony toils long hours harvesting nearby growths of herbage or grass. He totes tiny bundles cross-wise in his mouth and deposits them close to his burrows. These assorted cuttings are dried, sun-cured and finally stacked within his storehouse for winter use.

Attuned to danger sounds, the cony's ears will pick up warnings from far beyond human earshot. At the first alarm he is sure to pop, with incredible swiftness, into his rocky fortress. His rate of recovery from fright is slow. It may be hours before he will poke his head out to see if the coast is clear, and he will do that from some unpredictable point far from where he vanished.

The young in a cony litter may number from three to six, and two litters are produced each year, at least in some cases. As a rule, the young do not appear on the surface rocks until half grown.

Armed with this information, equipment and advice I set out for Paulina Lake—altitude 6338 feet—which lies within Newberry Crater, a crater gouged from a section of Oregon's Cascade Mountains. Many centuries ago, a flow of lava spread like thick molasses over parts of this crater. When the flow cooled a conglomeration of vari-colored rocks resulted. Perhaps fifty feet from the northerly lakeshore looms the "Black Slide." Here the lava flow had cooled and stopped abruptly. A precipitous cliff of black obsidian resulted. This cliff stands high above a narrow line of

THE ULTIMATE THRILL FOR THE AUTHOR-PHOTOGRAPHER. DARLENE IS NOW WHOLLY IN HIS HAND, ALTHOUGH A WAY OF RETREAT OVER THE ROCK STILL REMAINED. OTHERWISE IT IS UNLIKELY THAT THE CONY WOULD HAVE BEEN SO CONFIDENT.

timber that edges the lake, and is a small part of a mass of igneous rocks that extend inland a distance of several miles.

While making an early survey of the rock-mass, far inland from the Black Slide, I discovered some cony droppings. Nearby was a curious formation of rocks resembling a man's profile. I named this "The Old Man," and it was to become my companion.

The first few days of rock-sitting were fruitless, except for the discovery that the rocks housed a wide variety of beasts. Whistling marmots, seeming to enjoy my companionship, would emerge and pose statuesquely nearby. Once a full-grown marten ventured within ten feet of my perch. Daily, a slinking weasel (an animal of low repute and the conies' greatest enemy) approached and drew my rock fire. Each day at sunset, a lumbering porcupine would venture forth and begin his nocturnal prowl. Deer and bears were frequently seen in a nearby fringe of timber. About dusk coyotes would tune up, preparing for the evening concert. Sharp-eyed hawks and an occasional eagle circled overhead much of the day.

On expeditions such as this "Big Cony Hunt," senses become super-acute. A desire to hear, listen, watch, feel and smell is ever-present. One finds a land alive with bewitching beauty and interesting life.

After several days my vigilance was rewarded by a fleeting glimpse of a distant cony. More days passed, during which two appeared momentarily but kept their distance. Later in the week one cony came almost within camera range. Over-eager, I shot recklessly. These shots were failures. An attempt to move or focus the camera on the sharp-eyed animal was disastrous. The slightest move, an eyebrow or less, and it would vanish.

This went on for days. On the least chance, shots were made, but the law of averages appeared against success, and there was a monumental stack of ruined film.

One cony approached fairly close and would play hide-and-seek, coyly peering at me from crevices. Somehow, it reminded me of a girl-friend of my younger days named Darlene, and so I named the cony. Thereafter, I called her name when starting my rock-sitting. And there came the thrilling time when she would appear, at one crevice or another, directly after my call.

Wild animals are curious about unusual sounds and respond in various ways. Besides, they have distinct personalities, as did Darlene. One day at noon-time, she appeared at a crevice only a few paces distant. I tossed a fruit peeling close to the spot. A moment later and a twitching nose inched out to the peeling; then drew back. The bait had disappeared, but I was now sure that if rock crevices were baited, more than one cony would eventually approach and thereby increase my chances. But shortly after bait had been distributed, a horde of golden-mantled squirrels came swarming over the rocks. A food scout must have reported the find. They gobbled up every morsel while Darlene and another cony remained far in the background, disappearing whenever an enemy squirrel neared them.

A fusillade of small stones finally discouraged the hecklers, and from then on bait was distributed freely. Later in the week, Darlene, expectant of food, arrived before a spread had been set for her. She made the rounds and found the cupboards immodestly bare. Presently she poked her head into view and emitted one querulous *"eamp"* after another, plainly indicating her disappointment.

By this time it was cold, with a smell of snow in the air. Yet step by step and bite by bite, Darlene's appetite was breaking down her resistance. But, unfortunately, my time was up, and thus far none but unsatisfactory, long chance shots had been obtained.

The second summer came and Darlene and I had been reunited for some time when she cautiously approached my hand, which was resting upon a feeding rock. It contained small cuttings of papaya, a succulent and expensive bait that had been enticing her nearer to the rock. I was thrilled when she nuzzled my hand with her twitching nose. Yet, for no reason at all, she bolted several times. She would return and circle around to the little finger, which was saturated with (Continued on page 386)

Nature's Imitation Bandits

By MARGARET E. GROSS

Illustrated by R. Bruce Horsfall

THE RACCOON IS A MASKED MAMMAL

In days not so long past, every bandit was portrayed as wearing a black mask over the eyes. Perhaps some really did and maybe some still do, but Nature can duplicate almost anything that man has ever invented and there are some creatures, not at all bandits at heart, who also wear black eye masks.

Why do they have this black mask? It must be some sort of protective coloration, but just how does it work out? Do other wild creatures see them and become afraid? They surely do not know that some human burglars sometimes wear such a bandage to disguise their faces.

Perhaps the least known of these masked creatures, and abundant too, is the warbler called the Maryland yellowthroat. Here is as charming a soul as you would wish to meet. Shy but inquisitive, he will peer at you as you pass his favorite swale, and you may never know he is about.

Small, even as birds go, he is bright yellow of breast and throat, olive green on back, wings and tail. Look for

THE MARYLAND YELLOWTHROAT IS MASKED

him some day. Yellowthroats tell of their presence by singing rapidly "witchery, witchery, witchery." His mate is a plain little yellowish brown bird, with no mask at all.

Another masked bird is the cedar waxwing—and his cousin, the Bohemian waxwing. Similar in coloring, they both have black extending from the bill back through the eye. Practically everyone who knows anything about birds knows of them. But did you ever see them burglarizing anything? Of course they like fruit, and so take some from orchards, but that is not being a highwayman! The shrike, however, is considered by many to be just that, for he is well-masked, and though not a true bird of prey, he does kill small birds, and hangs them up to keep.

Perhaps best known of the masked mammals is the raccoon. Because he is a relic of more prehistoric times is no reason for his black mask! The badger has a less distinct marking, the black extending back farther on the head. Being larger than the birds mentioned above, and their appetites thus being stronger, the food they take is noticeable, and man, feeling as he does that the whole world belongs to him, might call these animals thieves.

The tree frog, or spring peeper, as we call him when he gathers with his kind in spring ponds to make a deafening chorus for a love song, has black extending back past his eyes. Tiny little creature, so abundant in late summer hopping busily through the woods, surely he is no masked bandit! His larger cousin, the wood frog, is even better masked.

Certain snakes seem to have dark markings through the eyes. Most people would agree that was appropriate enough, for most of us are taught to hate snakes, a repugnance that we are now assured by naturalists must be acquired.

Of course you can think of other black-masked pseudo-bandits. Have they any reason to be so branded? There are other instances of such positive markings to be found among unrelated wildlife, all marked with a similar pattern yet totally unrelated. Can you think of a few?

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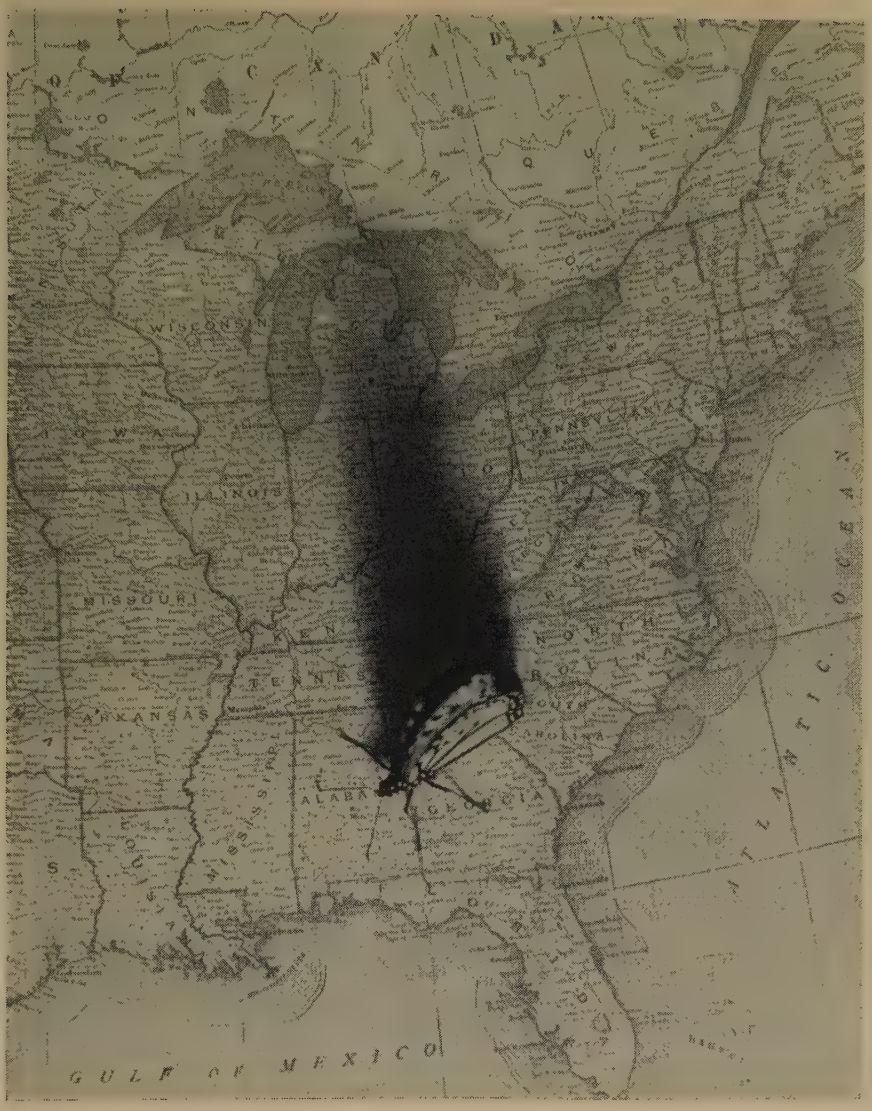
EXPLORER

By RUTH L. F. BARNETT

Think not to set him on the trail
That men have marked, nor yet to warn
Of dangers rampant to assail
The one to high adventure born.

Safe roads with their familiar dust
Can never soothe those questing feet
Like ways where they have learned to trust
The God who made adventure sweet.



THE MONARCH BUTTERFLY COVERS HUNDREDS OF MILES IN ITS SOUTHWARD MIGRATION

The insect on the map casts a shadow over the route it may have traveled, although the migration takes place from north to south all over the United States, between the Atlantic Coast and the Pacific. Some monarchs travel from Hudson Bay to the Gulf of Mexico.

Adventures in an insect garden lead one into the fascinations of many—

Insect Mysteries

Photographs by the Author

By EDWIN WAY TEALE

ONE June evening I was leaning close to an old pear tree, beside the hillside path leading to my garden, watching carpenter ants laboring among the miniature defiles and ridges of the bark. In the sunset light, these elevations and valleys formed vertical wavy lines of varying shades of gray and black. There was a sudden soft flutter of wings above my head. A small geometrid moth, its inch-wide wings also marked with wavy lines of gray and black, alighted on the trunk.

It clung there for an instant, facing up the bark. The lines on its wings crossed those of the wrinkled tree trunk; the effect suggested a bit of plaid. The insect stood out clearly against the bark. For only a moment, however, this contrast lasted. Then the little moth did an amazing thing. Pivoting slowly, almost in the manner of a locomotive on a switch-yard turntable, it swung about until the wavy lines of its wings joined the wavy lines of the bark. There it froze, motionless. It appeared to be a bit of bark fitting into place. Only the closest observation revealed its presence.

Since that evening, I have seen such moths alighting on tree trunks many times. On every occasion, they have come to rest facing across the bark instead of clinging in a vertical position in the manner of other moths. What age-old wisdom taught them to alight or turn in the position where their wing patterns would be used to the best possible advantage for camouflage?

Many of the riddles of insect life are found in the field

A MOURNING CLOAK PAUSES

This butterfly furnishes an example of the ability and habit of some insects and other forms of wild life to play 'possum when caught or in danger by seeming to be dead.

A GROWTH ON A FLOWER STEM?

No, this is a moth larva; one of the measuring worms. It is an excellent example of the mimicry frequently practiced by insects as a means of self-protection.

of camouflage and mimicry. It is comparatively easy for us to understand how, over long periods of time, katydids come to resemble the green leaves on which they feed, and seaside grasshoppers arrive at the color of the sand on which they spend their lives. The more a creature approaches its habitat in color the more likely it is to be overlooked by its enemies. Thus, each succeeding generation would spring from survivors that more nearly than the average resembled their surroundings. But other aspects of camouflage are not so simple. And some of them leave us bewildered and amazed.

One example is the stratagem for avoiding the attention of enemies used by the children of a geometrid moth. I have often found these little measuring worms feeding on daisies along the hillside. As they work, they bite off bits of petals from time to time and attach them, by means of glue-like saliva, to their backs. In the end, they look like parts of the flowers on which they feed. The ordinary measuring worm moves along with a characteristic looping of its body. The petal-covered caterpillars, however, shake as though attacked by palsy when they move. This trembling sets all the petal-fragments fluttering. To an enemy this movement might mean that the petals of the daisy were being stirred by the breeze. It is such gleams of cunning, encountered among even such unintelligent creatures as caterpillars, that amaze us most.

Mimicry of a different sort, the mimicry of death itself, presents still another riddle of insect behavior. I have had robber flies, ladybird beetles, monarch and mourning cloak butterflies, and ambush bugs, drop limp in my hand, feigning death, after I had captured them. A robber fly, attacked by a formidable rival, will sometimes resort to such a counterfeit catastrophe, falling on its back as though stricken and remaining perfectly quiet for minutes at a time. By such a ruse, it escapes the conclusion of a fight in which it is likely to be killed. The practical benefits of the ruse are plain; the mechanics of its operation are obscure. Is the monarch and the beetle—or, for that matter, the opossum, the bird, and the hog-nosed snake—entirely shamming in their counterfeiting of death? Or is some state approaching real death produced by fright and danger? In *Idle Days in Patagonia,* W. H. Hudson expresses the latter belief about the feigned death of certain birds.

One autumn afternoon, a host of little moths appeared suddenly in my insect garden. They rose and fell, fluttered and whirled above the golden rod of the hillside. They appeared to have emerged from the ground in unison like seventeen-year cicadas. However, the place of their origin was far from the slope where I watched them. Born hundreds of miles away, they formed part of one of the strangest mass movements in the insect world.

Each year, when winter begins its slow creep down the map, these cotton moths leave their southern fields and migrate not away from the approaching cold, but to meet it! As their ancestors have done for uncounted generations, they flutter northward in a migration in reverse, a fall flight that hastens their destruction. This flying to meet the cold, instead of fleeing before advancing winter, is as puzzling and as tragic as the suicidal migration of the Arctic lemmings. These Scandinavian rodents, on certain years, overrun farms, swim rivers, scale ridges, hurrying onward

ROBBER FLY ON A ROSE BUD

One of the best ways to observe the actions of insects and to try to solve some of the mysteries of insect life is to play host to many kinds in an insect garden.

A "FEROCIOUS" AMBUSH BUG

In fact, however, this insect is not as menacing in appearance as it seems in the picture. It is really less than one-half inch in length and quite harmless to man.

as though irresistibly drawn to the sea. Arriving at the coast, they plunge into the water, head out into the ocean, and disappear forever.

Their mass suicide is attributed to crowding and overpopulation. But why, with the vast stretches of the United States around them, do the cotton moths leave their southern fields and head north? What possible benefit can their topsy-turvy migration bring? And how did their mystifying custom originate?

In a day or so, my fields and garden see the moths no more. The multitude passes on, leaving behind a tantalizing enigma of insect behavior. It is one of the many question marks in the field of entomology; one of the many insect mystery stories in which the concluding chapters remain to be written.

A mile or so from my garden, an oak tree, rising on the edge of a grove, presents another entomological riddle. It appears no different from its fellow-oaks of the wood. Yet, year after year, when autumn comes, migrating monarch butterflies cling to its twigs in preference to all the other twigs of the oak grove. The tree is a sort of butterfly hotel, a stop-over used regularly by the migrating monarchs. In this fact there lies a double riddle.

Why do the insects choose this one tree among all the trees of similar kind and size and shape around it? That is the first of the enigmas. The second is even more puzzling. No monarch ever makes the long trip south a second time. Every insect in the great straggling flocks of brown-and-black butterflies wings its way over vast stretches of country, makes the journey for the first time. Yet, each new cloud of migrants settles down on the identical branches that the butterflies of a year before selected! All over the country, wherever monarchs migrate, such butterfly trees are known. The secret of their peculiar attraction remains to be fathomed by science.

For several springs, now, I have been interested in a riddle connected with the life of the cecropia moth. These beautiful creatures emerge from their cocoons, live only a few days, mate, and die. During this fleeting lifetime as an adult, they remain quiet during daylight hours and become active only with the coming of dusk. On several occasions, I have brought cecropias into my photographic darkroom and have left them there for a day and a night. Although no ray of light entered the chamber, during the daytime the moths remained as quiet as they would have outdoors in the sunshine. But, when night came, even though the blackness of their prison-room became not a whit darker, they began to flutter about, sensing in some unknown way that dusk had fallen.

Connected with the dark is another puzzle, one of the oldest insect mystery stories of all. In the Eighteenth Century, when the venerable American Philosophical Society was founded in Philadelphia, one of the earliest papers read before the scientific body related to the mystery of the firefly. The writer concluded: "We know not where these lamps are hid." Our knowledge has grown with the intervening years. But the full story of these living lanterns is still unwritten. The cool and flameless light of these nocturnal beetles remains the unattained goal of the illuminating engineer.

Some years, in the swampland at the foot of my garden, conditions seem to favor the multiplication of the fireflies.

There was one season in particular when their gleaming trails brought the dark lowland vegetation to life as soon as dusk descended. A vivid memory of that year recalls a moonlit night when the marsh was covered with a sheet of luminous silver mist shot through by hundreds and thousands of moving golden specks. Far into the night, this magic, fairyland scene remained, the golden gleams brightening and dulling, appearing and disappearing, across the whole length and breadth of the mist-filled marsh.

TWO LADY WALKING STICKS

The mystery about these insects is that despite careful hunting by insect enthusiasts no males have been found in the region of New York.

Among the rank vegetation of the swamp-edge, I sometimes come upon the slender green walking stick, *Manomera*. Invariably, it is a lady walking stick. I have yet to meet a male *Manomera*. For more than a decade, William T. Davis, of Staten Island, N. Y., has been capturing such walking sticks in the hope of encountering one of the elusive males. Members of the New York Entomological Society joined in the search. Yet, no one has ever found a male *Manomera* in this part of the country. Each spring, however, a new generation of these walking sticks is flourishing in the swampside tangles of my insect garden.

A hundred feet up the hillside from the edge of the marsh, a mouldering pile of fence-rails provides a home for carpenter ants. Whenever I look, I find them hurrying this way and that in their labors. They turn and twist, loop and zigzag until the brain grows dizzy watching them. Yet, in the end, all will return to the nest from which they came. Formic acid, left in a sort of chemical hare-and-hound trail, is believed to play an important part in guiding the insects home. Rocks, across which ant-trails run, sometimes are marked with white streaks, the product of accumulating formic acid. But this fluid does not give the whole answer to the riddle of the homing ability of the ant.

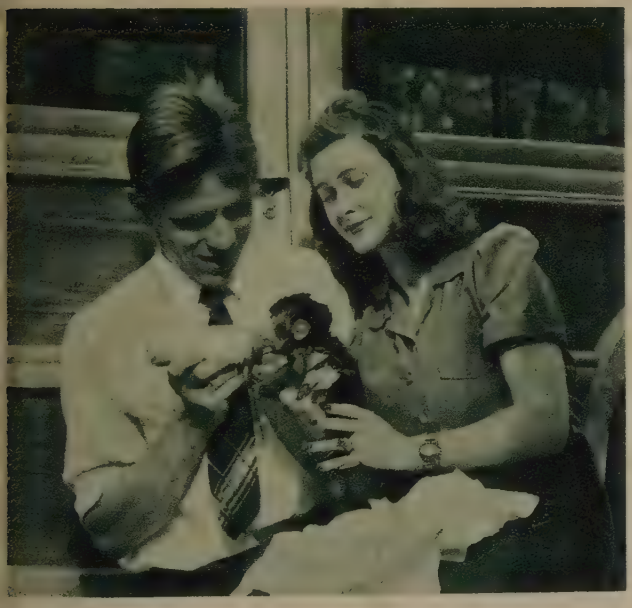
I have seen these insects—so poor in eyesight that they will run to within a fraction of an inch of the end of a grassblade before they realize it is the end—finish a winding journey in which they have headed toward all points of the compass and have covered a distance that is comparable to many miles for a man, and then, instead of retracing the path of the outward trip, head directly back to the home nest. Some ability, which still eludes complete explanation, must play a part in this performance.

The "language of the ants", their method of communicating and of organizing the work of the colony, furnishes an additional riddle. Some years ago, Miss A. M. Fielde demonstrated the amazing degree to which the labors of these insects are apportioned. She marked different members of the colony and then observed what each insect did. The same three ants, she found, visited the feeding spot every day. She removed one of these insects. Another took its place and continued to carry on the work of its predecessor. She removed the second ant. Again, a newcomer took over its tasks. Time and again, she removed food-gathering ants and saw other marked members of the colony take their places and continue the work until they, too, were removed. How were these successors chosen? And, how were they notified of their selection for such responsibility?

During winters, when insect life has disappeared from my hillside, I sometimes amuse myself by observing the activity of carpenter ants, brought home and established in an unused goldfish bowl. Here, during the evenings, I can watch the insects laboring among the mounds and peaks of rotten wood. On one occasion, an exploring ant discovered a small piece of overlooked bread which had lodged on a shelving promontory four or five inches above the floor of the bowl. Seventy-six times in thirty minutes, this lone worker carried crumbs across the miniature plateau and dropped them over the edge. Each time, it followed the same procedure. Reaching the edge, it braced itself with its middle and rear legs and placed its forelegs against the crumb held in its jaws. Releasing the bit of bread, it pushed it outward so it made a sheer drop to the floor below. Here, at the bottom of this cascade of food, half a dozen other ants toiled back and forth like porters, carrying the bonanza of bread crumbs to the interior of the nest.

All worked with machinelike efficiency. Each seemed to know exactly what was expected of it. Each did its part without variation. Yet, how had the insects decided on their tasks, how had they communicated, how had the orders been given? How is the whole complicated machinery of life in an ant-hill regulated?

Like that last sentence, much in the lives of the insects ends in a question mark. Mystery surrounds many of their activities and abilities. Tackling such riddles of the commonplace adds to the fun of owning an insect garden.



Carmeleta, the Baboon Babe

As recorded by Hugh and Zelta Davis

Carmeleta was born April 24, 1941, at four in the afternoon, in the Tulsa, Oklahoma, Zoological Park. Her father was a Guinea, or Sphinx Baboon, and her mother a Yellow, or Dog-faced Baboon.

Her introduction into this world was followed by a harrowing experience. The mother, for some reason, started to beat the baby's head against the concrete of her cage, scraping its face against rock and dragging the little thing about the floor by the tail. Carmeleta's cries brought aid and she was rescued by the director of the Zoo, Hugh Sterling Davis, who, with the aid of his wife, Zelta, took over the foster parenthood of the little baboon.

For the guidance of any others who may have to bring up infant baboons, the Davises, who are explorers, lecturers, writers and photographers, kept a careful record. At birth Carmeleta barely nudged the scales to the half-pound mark. At one week she had gained to one pound, one ounce. Thereafter she steadily gained two to three ounces a week until, at eight weeks, she weighed in at two and three-quarters pounds. At four months she had reached three pounds, four ounces.

Canned, powdered baby milk served as food, a tiny doll nursing bottle providing the one ounce consumed at a feeding. These meals took place every three hours, night and day, for the first week, the interval gradually being lengthened to one every four hours.

The first solid food, which was Heinz strained baby food, was introduced at six weeks. This was eaten in

Four episodes in Carmeleta's life. The little baboon photographed with her mother when the baby was a half-hour old, and before she was mistreated by her parent. At one day of age the foster parents introduced the nursing bottle. At two days "Carmey" meets the Easter bunny, and is provided with a diaper after a proper dusting with talc.

At four weeks "Carmey" exhibits a moist chin just after feeding. At six weeks she stands to enjoy a meal of strained food and applesauce. The bathing episodes took place at eight weeks. A toothbrush served as the baboon's scrubbing brush, and "Carmey" closed her eyes while the pompadour was being properly shampooed.

addition to a ration of three full ounces of the milk at each feeding. At four months, milk, bananas, grapes, watermelons, cantaloupes, peaches, toast, strained baby food, carrots, applesauce, custard, cereal, spinach and other items from the table were relished.

Carmeleta cut her first tooth at five weeks and added another every few days until she had sixteen at four months. She first walked on May 1, at the tender age of one week.

Baboon babies, according to the Davis record, are not prohibitively expensive. She cost her foster parents $15.97 during her first four months, the largest item being $10.68 for a dozen cans of the canned and powdered baby milk. Other items of cost included nursing bottles and nipples; laundry of towels; diaper material; two dozen cans of strained baby food; baby powder and baby oil. Other dietary items came under the family food budget.

At nine months Carmeleta weighed six pounds, *sans*

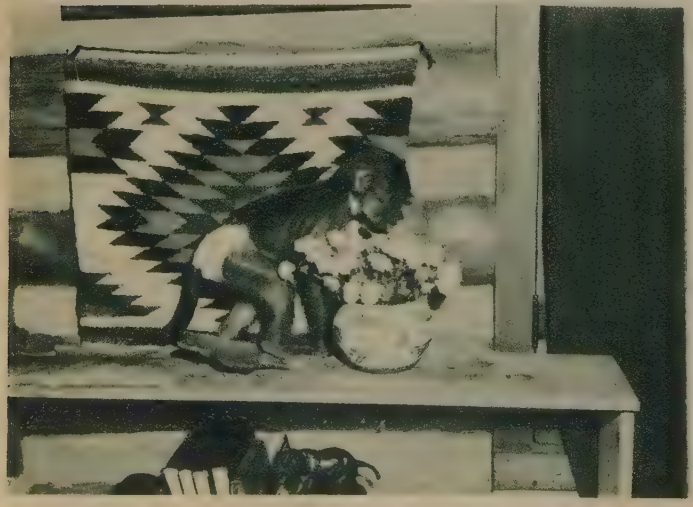
Above, a serious little baboon —who has never exhibited any affection for her real parents but much for her foster kin— poses as though the weight of the world were upon her shoulders. However, into a baboon's life some joy must come for she is plainly enjoying the joke that her photogenic foster mother appears to have told her.

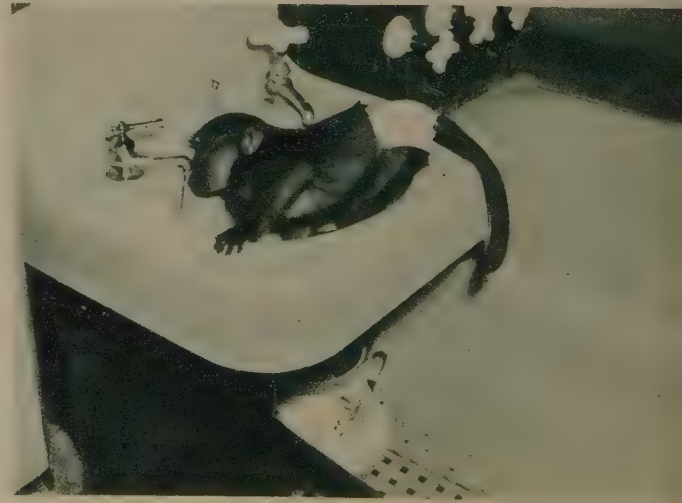
By the time she is eight months old Carmeleta has lost many of her purely baby ways. Carrying a little rubber doll, she roams about looking for a likely place to hide it. The rug seems a proper spot so she turns it back and carefully lays her plaything down, recovering it lest prying eyes find it.

Then off to the kitchen where a sugar bowl contains some delectable but forbidden dainties. Caught at this, and foiled at her project of filching some, she returns to the living room for a little exercise at climbing. The bookcase offers a good chance at a workout, but the Indian bowl on top is in dire danger of being knocked off in the process.

diaper. Her diet was quite varied, and she would take milk from a glass, or hold the bottle herself. She would have nothing to do with her baboon parents when taken to the Zoo to visit them. In December a new element came into the little baboon's life when the Davis family was increased by the arrival of Hugh Blaine Davis. Carmeleta developed jealousy, and was plainly indignant when the baby's bottle was prepared and not offered to her. Papa Davis complained that "Carmey" would squeal in jealousy, awaken young Hugh and set father Hugh to walking the floor. He added philosophically that "zooites get used to such monkeying around."

Dissuaded from the glassed-in bookcase, Carmeleta finds another sport, and indulges the esthetic in her by a hearty sniff at the flowers. All this activity is extremely exhausting and works up a thirst, but she knows how to take care of this for in the bath room there is a shiny affair that is a sort of perpetual spring for thirsty baboons.





The Redwing

By EDWARD A. PREBLE

Photographs by Karl H. Maslowski

Not long after the spring sun has banished winter's snow and ice from our northern marshes, the country boy is greeted with a joyous musical message from the oozy meadows. To some it seems to say "kon-quer-ee", but just as likely it is "here-am-I," or "you-come-here". At a distance a number of these calls may sound like a chorus, but a search will usually disclose that each songster is alone. Earlier, he may have flocked and sung with his fellows, but now he has no thought of sharing his melody with any male.

There is now no greenery in the meadow, but here and there rises a bare shrub, or perhaps a cattail stalk, and here he perches.

Each bird surveys, and defends, an area that later will be a tangle of green grass or rushes. What he thinks as he sings no one may know, but we may be sure that he knows that last year his children were fledged here, and

that a new family soon is due. Although no mate has yet appeared he has staked out his claim, and defends it against all comers.

Before long, under the urge of the strengthening sun, green spikes in the mud give promise of sheltering herbage. Now the females have come from the South. The weeks that follow are busy ones. The guardian male must still defend his acres, and as the time for nesting draws near he must persuade his mates (for he is somewhat of a polygamist) to bide on the spot he has selected. It is much better than any other place. He is sure of this, for he has found it so.

So the days fly by, the rushes rise higher and thicker, and by June the curious boy, wading through the tangle, may find two or three nests, like the one shown here, each presided over by a sparrow-like bird as unlike her gay mate as one can imagine. If the nests be grouped closely, the chances are that only one gay captain with the epaulettes can be found in that area. But no questions are asked, and each mother guards her speckled, scratch-marked eggs just as cheerfully and zealously as though she had a whole flock of most devoted husbands.

Wing Windows

By EDWIN WAY TEALE

The outstanding feature of the beautifully marked and colored wings of the American silk moth, *Telea polyphemus,* is a large and striking eye-spot that stands out on each hind wing. Ringed with black and set off by a large blue patch, the central "pupil" of this imitation eye is transparent and colorless. At first glance, it appears to be made of isinglass. In reality, it is formed of chitin (pronounced ki-tin), the hard material that provides the outer armor, or skeleton, of all the insects. The eye-spots on the wings of the polyphemus moth are unusual because of the transparency of this material. Even fine print can be read through the little windows, as can be seen in the photograph of a moth's wing laid on a printed page. Less conspicuous eye-spots, also with transparent centers, decorate the front wings of these insects. The value of the large, striking imitation eyes on the hind wings of the polyphemus and some other lepidoptera has been debated by scientists. Charles Darwin thought they attract the attention of birds that prey on the moths and cause them to strike for the hind wings rather than the more vital body. However, there may be other reasons and man must content himself with guesses.

The wing "eye" of the Polyphemus moth is laid over a piece of typewriting. The "eye" is large enough for two characters of the usual typewriter size letter to show through with remarkable clarity.

The Lotus

It is popular in legend that four thousand years ago, in the sacred gardens of Egypt, where the people came to worship, there were pools of porphyry in which grew the lotus—sacred lily of the Nile. Most students of botany and history, it is true, agree that the sacred lily of the ancients was a waterlily, *Nymphaea*, and not a true lotus. But whether the ancient Egyptians worshipped one or the other, it is certain that, since the introduction to Egypt at some unknown date of the lotus of the Orient, *Nelumbo nucifera*, the modern Egyptians have given this plant due reverence.

Wherever any species of true lotus occurs, we find the people responsive to its beauty. Perfect in its shield-like leaf and in bud and opened flower, lifting its head high above the muddy water where it is rooted, it may well be considered symbolic of the rise of the soul of man from his earthy surroundings. Thus we find that it is prized to an extent we of the West can hardly conceive by all the races from Japan and Persia south through the East Indies to Australia.

Here in North America we have *Nelumbo lutea*, essentially like the Old World species, but with yellow flowers in place of pink. It is found here and there through our middle states, and rather widely in the Mississippi Valley, where evidently it was spread by cultivation by the Indians, who valued it locally as food.

The illustrations are of the Asiatic species, the result of a planting in the Water Gardens at McIntosh, Florida, of stock brought from the land of the Pharaohs. Photographs are by courtesy of Kramer's Studio, Plant City.

Nature in Print

By HOWARD ZAHNISER

ANDREW S. WING'S article in the May issue of this magazine set at least one reader and his wife to thinking more definitely than ever in terms of a living that might be both urban and rural. So far the practical results have gone no further than the setting out of a couple of dozen tomato plants with a border of lettuce, and a somewhat more extensive imaginary gardening prompted by Francis C. Coulter's *A Manual of Home Vegetable Gardening.** Perhaps that is as far forward as we shall get during this 1942 growing season, but the delays themselves this year may make the prospects for another spring all the better and surer. We shall hope so, for now is a time according to all good advisers for Americans to be getting closer to the sources of their living.

Paradoxical as it is in a nation where industries and urban arrangements have reached their greatest developments, Americans as a whole are farmers by aspiration, outdoor folks by preference, and indoor city people only because it is usually so much easier to accept the city's hardships than to surrender its luxury and enter upon the certain labor of cultivation. Like my young son, and his father also, they like to be farmers, but a bit of manual labor often makes the preference more to be enjoyed than acted upon. What the next few years may have in store in the way of forced opportunities to indulge this treacherous fancy for rural living none of us know, but we can be sure that the rewards will come only through hard work, which itself may be among the greatest benefits though gained reluctantly and prized most highly in reminiscence.

Angus McDonald, an expert in the Soil Conservation Service, has certainly conditioned well any readers of his *Old McDonald Had a Farm* who may be yearning for a farm as a scene for a life of rural ease. "I'm sick of the city," said Old McDonald. "I've been living in cities for forty years, and what have I got to show for it?" His wife agreed. "That's all you've talked about ever since I've known you," she said. "You'll never be happy until you live on a farm." And so the preacher bought a farm and proceeded to become the best farmer on the circuit where he preached the gospel and soil conservation from the same texts. But Angus McDonald makes it plain that the greatest ingredient of his father's success formula was hard work—hard work by the whole family. "Forthright, cantankerous, hard, yet strangely lovable, Old McDonald is the stuff America is made of," say Angus McDonald's publishers, and the book—one of the most interesting and raciest of the recent series of family recollections—substantiates fully their advertisement and their phrasing of the impression a reader gets of the significance of Old McDonald's achievement. The minister at his funeral, says the author, "told what a good man he was and how many souls he had saved. He didn't mention the soil he had saved."

It is a current virtue, however, to recognize the worth of a soil saver, and Angus McDonald has cultivated this virtue further in an excellent Government publication called *Early American Soil Conservationists.* Soil conservation has been among the great American efforts of the past decade, yet it might have been a national policy from the beginning. Jared Eliot, another clergyman, incorporated soil-saving ideas, based on experiments and influenced by John Bartram, "the first native American naturalist," in a series of essays on agriculture published in 1748. Seven other pioneer soil savers Angus McDonald discusses, down to and including Edmund Ruffin, who fought exploitation of southern soils and apparently felt that he was continuing this fight when he fired the first shot at Fort Sumter.

"Conservationists over a century ago called the attention of farmers to the dangers of erosion," says McDonald in summarizing his publication. "They devised control measures in relation to slope, soil type, and the climatic differences in various parts of the country. They also pointed out the danger of exploiting the land by cash crops and the necessity for Government cooperation in soil conservation. When John Taylor (1753-1824) remarked that the well-being of the farmers and the preservation of the soil were necessary to the well-being of the Nation, he was stating a fact that has become one of the basic principles of soil conservation in the United States."

"Old McDonald's" struggle was the harder because he too was working out these basic principles, as well as producing crops. His years and his family's years of hard work, for this reason, need not actually be as discouraging to would-be migrants from city to country as they might at first seem. With the evangelical zeal of his soul-saving profession, Old McDonald was not content to take over a good farm. Having for years been endeavoring as a preacher "to seek and to save that which was lost," he became a farmer with the same motive, buying a run-down, eroded area in a region devoted to a great cash crop and remaking this land into a prosperous farm devoted to subsistence as well as (Continued on page 388)

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*Recently published books discussed in this article are:

A Manual of Home Vegetable Gardening. By Francis C. Coulter. Garden City, N. Y.: Doubleday, Doran & Company, Inc., 1942. 279 pp., with foreword by Richardson Wright, 88 drawings by Tabea Hofmann, appendix listing spring and fall frost dates, garden measurements, State agricultural experiment stations, and data regarding leading varieties of vegetables, and index. $2.50.

Old McDonald Had a Farm. By Angus McDonald. Boston: Houghton Mifflin Company. 1942. 278 pp., with 16 drawings by Richard Bartlett. $2.75.

Early American Soil Conservationists. By Angus McDonald. Miscellaneous Publication No. 449 of the United States Department of Agriculture. 1941. 63 pp., with 4 photographs, a drawing, 4 reproductions of portraits, and list of literature cited. 15 cents, from Superintendent of Documents, Washington, D. C.

Forward to the Land. By Elmer T. Peterson. Norman, Okla.: University of Oklahoma Press. 1942. 283 pp., with foreword and cartoon by J. N. Darling, 17 photographs, 2 graphs, appendix regarding grazing on public lands, and index. $2.75.

Tree farming on a large scale and protection from fire create a—

Forest of Tomorrow

BILL PRICE HATED FIRE

By EDWARD FENTON

FROM the beginning, Bill Price hated fire. Summer after summer during his boyhood, he saw the damage wrought by the forest fires that roared and crackled through the Kettle Range of the Cascade Mountains in northeast Washington. He grew up in the little town of Republic, Washington, now the headquarters of the Colville National Forest. It is a region of thunderstorms of particular frequency and violence, as many as one hundred fires having been started by the lightning of a single storm.

When he was fifteen, Bill Price first helped to fight fire. Just as boys from fishing villages take to the sea, so Bill, a product of the Northwest wilderness, took to the woods. He became a summer employe of the United States Forest Service, helping with the pack-trains carrying supplies to fire fighters deep in the forest.

Thus Bill Price, an earnest youth in love with the out-

OFF TO BATTLE A FIRE IN THE UNDERBRUSH

Where the blaze cannot be met by road, and thus fought by motorized equipment, the fire fighters must pack in hose and a portable, gasoline-powered water pump. Little fires become big fires and the sooner they are tackled the less the timber loss.

doors, saw how years of effort by Nature could be laid waste by Nature's own means—lightning. He learned how to fight fire the hard way.

This boyhood zeal for protecting the forests shaped the course of Price's career. He entered the College of Forestry at the University of Washington and after two years of study returned to the woods to apply his knowledge as a ranger with the United States Forest Service. For four years he worked in the national forests of Washington and Oregon, then reentered the university to complete his formal education.

Graduating in 1926, Price went to work for the reforestation department of Weyerhaeuser Timber Company. His first job was to examine and classify cut-over lands. Then came the tree farm idea.

Today Bill Price, a lean, tight-lipped man of 42 whose outdoor life cuts a decade from his apparent age, has answered his country's call and is serving as a captain in the United States Army. But when the war is over he will be back—back to the trees he loves so well and the project which means so much to the future of America.

He typifies, in fact, those private foresters who are devoting their energies and experience to demonstrating that forestry can be practiced in the West as a commercial enterprise. They believe that the old methods of warfare against forest fires are obsolete and must be replaced by new techniques, and they are applying these techniques in a practical way on western tree farms. One such proving ground is the Clemons Tree Farm, which includes some 130,000 acres of cut-over land in Washington State. On this tract the Weyerhaeuser Timber Company is endeavoring to demonstrate that it is commercially practical for private enterprise to grow timber as a crop on cut-over lands.

If the project works out it may change the entire economic future of thousands of acres of lands now considered to be of little value. Barren, cut-over areas will support a permanent, replaceable resource as dependable as any agricultural crop.

About half the land occupied by the Clemons Tree Farm is owned by the Weyerhaeuser Timber Company; the rest by smaller owners and the State. All of these owners are cooperating to make the project a success.

Mike Grogan, who has fought forest blazes all over the United States, and who tends the farm as carefully as your Aunt Agatha tends her bed of peonies, believes that the main menace to reforestation projects is fire. To combat it, he has devised a system that for thoroughness and efficiency rivals the set-up of a panzer division. In fact, it is based on the same plan: Getting there fast with a well-equipped force.

"When I was a boy I saw that fighting fires often was a case of 'too little and too late,' " Mike says. "One man with a bucket of water—on the spot when the fire starts—is worth a hundred men the next day."

Grogan and his men have laid out a system of roads over which heavy fire-fighting equipment can be driven to within 1000 feet of any point in the area. In all there will be 170 miles of these roads, none of them with more than ten per cent grades and all usable at twenty-five miles an hour speed. They were economical to build, because they were constructed on the still existing beds of railroad spur tracks used in the original logging days. Further to speed transportation, the old main railroad line will be rehabilitated to act as an axis on which to base operations. Another memory of older days is the present headquarters of the farm. It is the schoolhouse made over into a modern fire-dispatching center.

The Clemons Tree Farmers rely upon observation technique as heavily as does a modern army. The farm is dotted with lookout towers in which, during the fire season, men are constantly posted. They are equipped with direction finders so that the exact location of any telltale wisp of smoke may be accurately and instantly calculated. Alarms are sounded over short-wave radios and an intricate network of telephone lines. Men assigned to patrol particular danger spots carry portable two-way radios.

During the summer fire season, the farm's permanent personnel is augmented by forestry students who work during their vacations in order to obtain valuable experience. They get excitement, too. Perched high in fire lookout-towers, the boys get a real blitz from the elements whenever there is a thunderstorm. During bad storms the heavens blaze so rapidly at the isolated lookouts that protecting lightning rods are melted away.

Since the war began, many strategically-located lookout-towers are being used by aircraft spotters who have volunteered for Civilian Defense.

As armies require ammunition, so do forest protection men require water to quell the blazes with which they are constantly threatened. To guarantee a water supply, streams have been dammed, springs and water holes enlarged, and water tanks are being erected at the highest points.

While the fire brigade is organized much like a metropolitan fire department, the equipment is designed particularly for the type of country in which it must be used. Trucks carry 150- to 500-gallon tanks of water and work in relays, one refilling its tank from the nearest stream or water hole while the other sprays its load upon the blaze. Drills are held regularly to accustom the fire fighters tc meet any possible situation.

Experience has shown that if a fire is not to spread, the fighters must start dousing it within a few minutes after it has started. In one of the regular practice alarms the backwoods pompiers were throwing water on the smoke-bomb "blaze" six minutes after it was set off.

The protection given the Clemons Tree Farm must be so complete because the project would be given a considerable setback if more than one-fourth of one per cent of the total area were burned over in one year. That means only 325 acres—and some forest fires rage through thou-

FULL STREAMS ON THE FOREST BLAZE

The fire lookout man has sighted the fire and located it through his special apparatus. His report to central headquarters has sent the mechanized division into action, dispatching it off over the fire roads to the scene of the blaze and the fight is on.

sands of acres. So quick, sure fire-control is essential.

Just as the inhabitants of bombed cities fear the moonlight that illumines targets for the benefit of the enemy, so do forest protection men dread low relative humidity. At all times during the fire-season, their eyes are kept constantly on the instruments that tell them how dry the air is. When the humidity is below 60 per cent, they get on the alert; when it gets down to 30 per cent, they call out the fire fighters to stand by. A fund of statistics compiled as carefully as the actuarial tables of an insurance company tells them that when there is only 30 per cent moisture in the air one spark may cause a conflagration.

It sounds expensive, this highly-organized system of fire protection. Well, the way it is worked out, a single Douglas fir can be protected from fire for 50 years for an expenditure of less than twenty cents! And that includes the original $90,000 investment in road construction and the necessary equipment for the entire protective system.

Some time in the future the Clemons Tree Farm will be growing from 100,000,000 to 130,000,000 board feet of lumber each year. That is enough to furnish new homes required for a city of 35,000 for an average year.

An astonishing thing—to those not in the know—is that this former stump area will produce substantially more timber as a scientific project than it did when a virgin wilderness. This is because the trees will be harvested from fully-stocked acres when their maximum growth has been attained and before destructive insects and disease take their toll. Trees, like children, grow fastest during what we might call their adolescence.

Our children's children and their children will reap the benefit of pioneer tree farms such as this. And Price and his associates will leave behind them a record of accomplishment to mark their passage through the world. The living forest will be their memorial and the whisper of wind through lofty tree-tops of the forest their epitaph.

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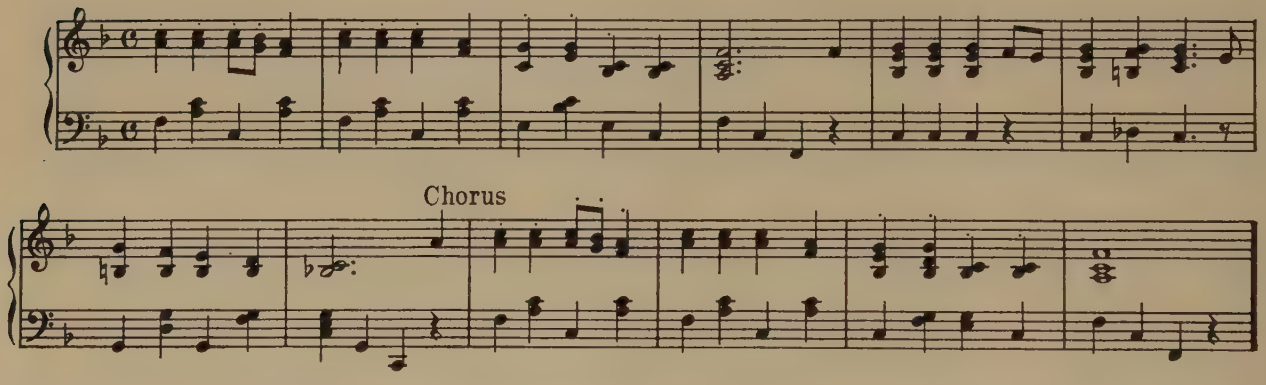
The Woodpeckers

Words and music by GRACE KEIR

Reproduced from "Songs of the Open" by special arrangement with the publishers, Carl Fischer, Inc.



"Rap-tap-tappy-tap! Rap-tap-tap!*
And Rap-tap-tap! Go I."
"Who is that making holes up there?"
"A Downy, friends, you spy."

Chorus:
"Then Rap-tap-tappy-tap! Rap-tap-tap!
Then tap until you fly."

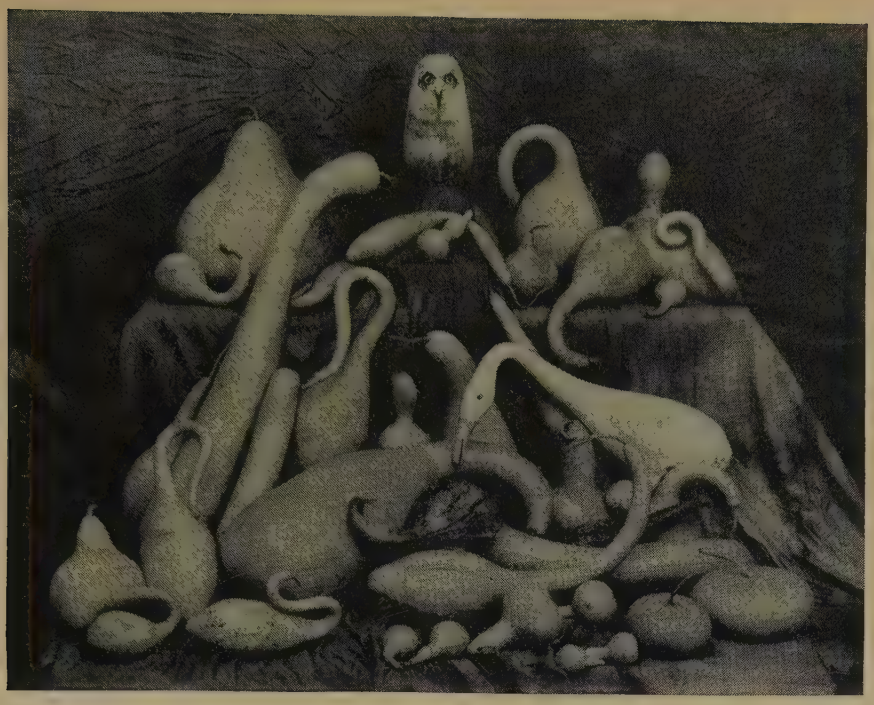
"Rap-tap-tappy-tap! Rap-tap-tap!
My,—how the chips do fly!"
"Who is that in the old dead tree?"
" A Hairy, friend, am I."

Chorus:
"Then Rap-tap-tappy-tap! Rap-tap-tap!
Then tap until you fly."

"Rap-tap-tappy-tap! Rap-tap-tap!
I tap when on a spree!"
"Who is that on the roof up there?"
"A Redhead, don't you see?"

Chorus:
"Then Rap-tap-tappy-tap! Rap-tap-tap!
Then tap until you fly."

**When singing "Rap-tap-tappy-tap!", etc., the children should tap on wood with the fingers to imitate the Woodpecker.*



SOME EXAMPLES OF THE FANTASTIC FORMS OF LAGENARIA GOURDS, TWO OF WHICH HAVE BEEN TOUCHED UP WITH A BIT OF IMAGINATION. PHOTOGRAPH COURTESY OF THE GOURD VINE, FROM "FIRST GOURD BOOK".

While they serve many useful purposes you will also find that—

Gourds Have Glamour

Garden Editor, Nature Magazine

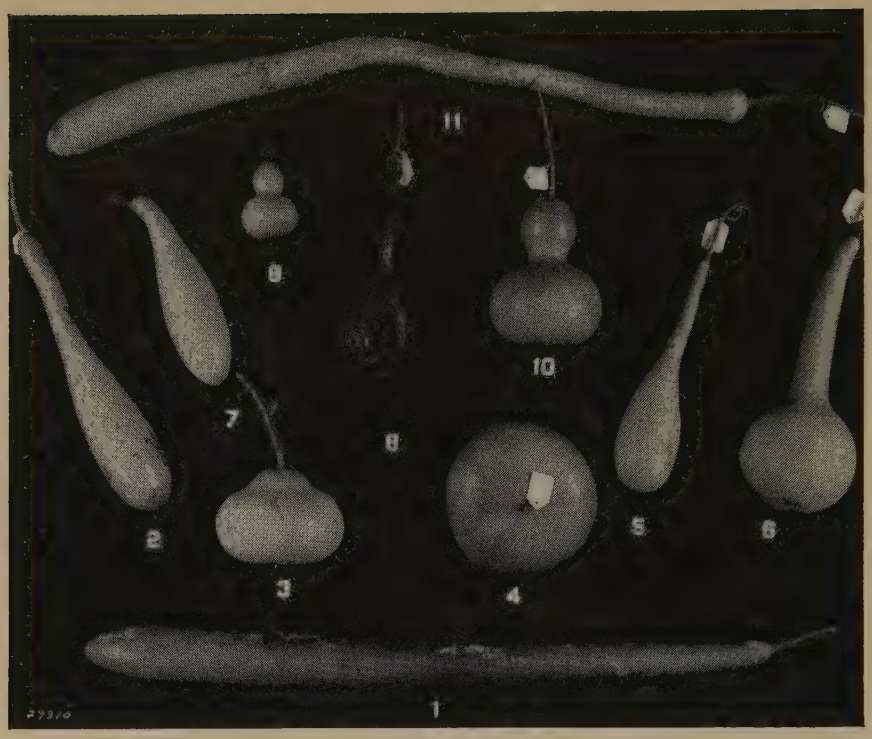
By ANDREW S. WING

THE GOURD is probably the oldest natural utensil of civilized man. It has been grown and is being used today by almost every people living in a climate suited to its culture. Gourds are eaten and used to carry water or for storage; they provide spoons and ladles, musical instruments and rattles; they serve native rites and religious ceremonies, and as a substitute for metal money. Last but not least, they are extremely decorative, either in their natural forms and colors or when carved or colored by native artists.

Most of us remember the few simple gourds used by our grandparents who happened to live in the country. There was the little white nest-egg gourd; the handy darning gourd with its handle; the dipper gourd that hung by the well or in the spring-house. Perhaps a bird-house gourd was inhabited by bluebirds or a chattery family of wrens; in fact, our earliest explorers found them so used by the Indians. Who grew the gourds or whence they came we never knew, but they always seemed to be around.

Then suddenly the public became gourd conscious—almost overnight. Gourds became fashionable. What brought this about I am sure I do not know, except that it possibly derived from the interest in the architecture and arts of the Indians and Mexicans of the Southwest. Whatever the cause, the fact is that gourds suddenly bounced into favor as objects of art and decoration. They appeared in show windows of stylish Park Avenue florists, and all the up-to-snuff garden club ladies went for them in a serious way. Before long commercial growers were making a nice little profit by growing them in assorted shapes and sizes for the carriage trade. Tourists returning from Mexico, Jamaica, Peru and other foreign lands came home laden with quaintly carved and decorated gourds, and no patio in California or Arizona was complete without at least one string of the gourds commonly known as a "Ramona's Love Charm."

Inevitably and soon, a group of gourd hobbyists and specialists developed. Some of these collected gourds; others had great fun trying to see how many varieties they could discover and grow. Naturally a good deal of research was done by these gourd fans and several books were written, including one by the dean of living plantsmen, Liberty Hyde Bailey. Anyone curious enough to do a little reading will soon discover that the gourd is an old institution. Its history goes back into the days when man was still using stone axes and before he had learned to



SOME VARIETIES OF LAGENARIA. 1. HERCULES CLUB. 2. PIPE. 3. KETTLE. 4. DEPRESSED BOTTLE OR FLAT. 5. DIPPER. 6. KNOB KERRIE. 7. POWDER HORN. 8. MARANKAS. 9. MINIATURE BOTTLE. 10. BOTTLE. 11. NEW GUINEA BUTTER BEAN. PHOTOGRAPH FROM "GOURDS", COURTESY OF A. E. HUTCHINS, UNIVERSITY OF MINNESOTA.

make pottery. Indeed, the history of the gourd is one of its chief fascinations. Before long an International Gourd Society was started in California, and The New England Gourd Society was founded in Boston. Even a magazine devoted to gourd culture was created and named *Gourd Seed.* Gourd shows and exhibitions were held and growing and collecting gourds became almost a cult.

The more erudite collectors turned to the Orient to discover the fascinating cricket cages and pigeon whistles that clever Chinese craftsmen carved from gourds. The Chinese like to keep crickets for pets, and they confined their chirping playmates in beautiful little cages made from carved and enameled gourds. Another typical Chinese custom is the tying of light whistles to the backs of pigeons so that a lovely sweet moaning sound or a whistle is made as the bird soars through the air. Gourds, being so light and tough, were ideal for this purpose.

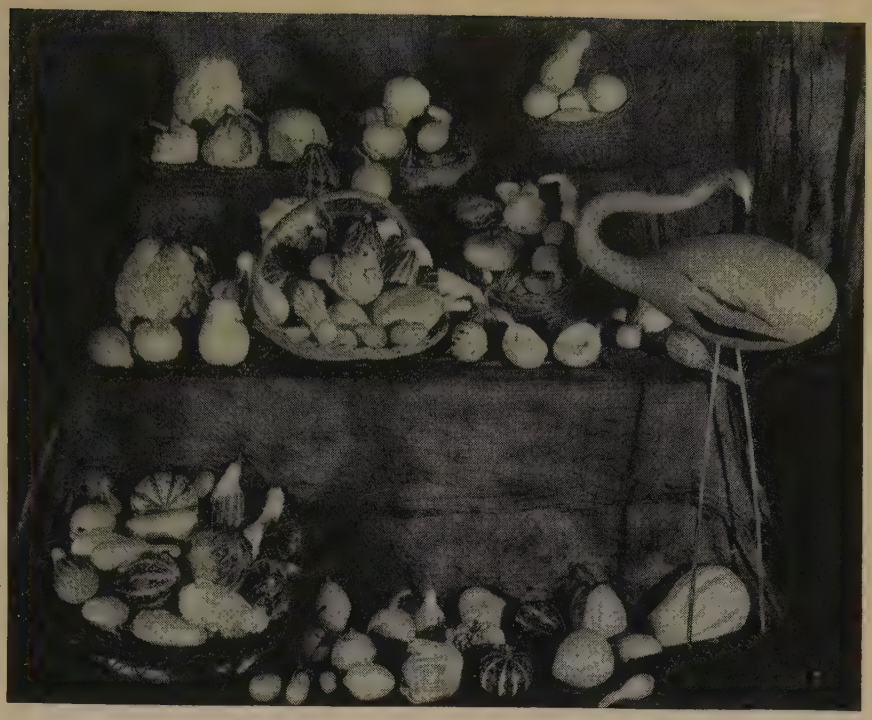
Meanwhile, gourds were being eaten and used in a hundred different ways in India, in Rome, in North Africa, in the West Indies, and in North and South America, long, long before the Spaniards touched these shores. We know this from the records of early historians and botanists and from gourds found in ancient ruins and tombs.

Botanically, it is interesting to note that not only does the family include all the hard-shelled kinds, but also the squashes, pumpkins, melons and cucumbers. There are two main generic groups, *Cucurbita,* which have yellow flowers and are day bloomers, and *Lagenaria* or hard-shelled gourds, which have white flowers and are night bloomers. While we commonly apply the name gourd to the hard-shelled varieties, the English use it to include all the colored and edible varieties. Fortunately, we need not worry too much about the botanical names or origins of the different species. You can obtain fifteen or twenty varieties from a reliable seedsman without much difficulty, and if the source is good you can be sure of maturing an interesting assortment to keep and to distribute among your friends.

Nevertheless, it is worth while to bear in mind that, botanically, the 300-pound pumpkin that catches the judge's eye at the county fair is the same as the one described by Linnæus in 1753 as *Cucurbita pepo.* Dr. Bailey in his book, *The Garden of Gourds,* states that Linnæus did not know the origin of the gourd as it had already been in cultivation by man for thousands of years. Curiously, there are at least three wild species of gourds found growing wild in the United States, and one of these, *Cucurbita texana,* which is found in river valleys in southern Texas, is presumed to be the parent of all the gourds that were used by our American Indians. Bailey insists that this is probably the same species as the one described by Linnæus as *Cucurbita ovifera,* meaning egg-bearing, from the shape of the fruit. Our common summer squashes as well as the delicious little Acorn or Table Queen squash are also *C. pepo.*

Since we are primarily interested here in the inedible and ornamental varieties, we will skip the fascinating field of the table varieties, merely mentioning in passing that if you have not tried the so-called Italian vegetable marrow varieties, such as Cocozelle and Zucchini, you have a real treat coming to you. Not only are they delicious in flavor and quality but they bear prodigiously from compact bushes instead of vines. Picked while young and tender, and flavored by a knowing cook, they are most delicious. An English friend recently gave me a jar of squash marmalade, delicately flavored with ginger—an interesting variation from orange marmalade.

It was Henri Christophe, the famous black king of Haiti, who literally turned gourds into gold. After the corrupt French rulers had been banished and Christophe had defeated his negro rival, the finances of the little state were in bad shape. The government was bankrupt and



A COLLECTION OF SMALL ORNAMENTAL GOURDS THAT BELONG TO THE CUCURBITS. THE FLAMINGO IS DECORATION AND SORT OF GUARDIAN FOR THESE INTERESTING AND VARIED SPECIMENS. SOME OF THESE ARE HYBRID AND OTHERS ARE NAMED VARIETIES. PHOTOGRAPH FROM "FIRST GOURD BOOK" BY COURTESY OF THE GOURD VINE.

money was almost non-existent. The shrewd negro dictator then hatched a scheme worthy of Alexander Hamilton. As a substitute for currency he needed something indispensable to the peasants, something that was not too perishable. Since gourds were in constant use by every family as utensils, he chose them. But instead of confiscating the gourds in private use, he chose the easier way of collecting all the new crop for the state. Donkeys and carts piled high with green gourds came pouring down from the hills, bearing a total of 227,000 gourds in all. These were carefully cured and stored in the "treasury". Gradually, as the carefree natives wore out the old gourds, he traded them new ones in exchange for their coffee crop. The fixed price was twenty sous for each gourd.

The coffee crop thus acquired was shipped to France and sold for gold, which, in turn, was brought back and stored in the treasury. Within a year Christophe had restored the finances of the country. And to this day the *gourde* is the standard coin in the rich little black republic.

There is abundant evidence that gourds were used both for food and utensils by American Indians long before the Spaniards came. Gourds were in common use in many tribes as dippers, water bottles, spoons and containers for salt and other food items. They were carved into masks, and were used as rattles and for many other purposes in religious ceremonies and tribal dances. Indian clowns did queer tricks with gourds.

In Mexico and in Central and South America, the Indians made beautiful carvings on the smooth faces of large gourds of the calabash type. I have some interesting carved and colored gourd baskets that came from Jamaica. The finest carvings I have seen came from Peru. The Mexican Indians do bright and interesting paintings on broad panels. Everyone is familiar with the calabash pipe, which was originally almost a South African monopoly. This should not, however, be confused with the tree calabash, which belongs to another family. The rattles used by dance orchestras to play rhumbas are usually gourds mounted on wooden handles.

The culture of most kinds of gourds is both simple and easy. Give them sunshine, good drainage, an abundance of plant food and moisture and they will be happy. Being mostly tender annuals, they resent being planted until the ground and nights are fairly warm. Although gourds may start a little slowly, they will soon be clambering over fences, shrubs, trees or anything within reach of their clinging tendrils. To grow them at their best, train them over wire fences, trellises or brush piles. At least keep them off the ground by mulching with straw or tarred paper. Since gourds fall prey to all the insects that attack melons, cucumbers and squashes, plant several seeds to a hill to allow for casualties, and dust with calcium arsenate or a rotenone compound to keep the beetles away.

Take a good look at the flowers of gourds sometime—they are truly beautiful. The squash blossom, which is very similar, has long been a sacred symbol of the Pueblo Indians. In an amazingly short time after flowering begins you will see baby gourds hanging all over the vines. It will fascinate you to watch the different forms taking shape—the baby eggs, bottles, snakes, and the mammoth Hercules club. An Iowa man once sent me a collection of twenty-two different gourd seeds. Some of these did not grow or mature, but I harvested at least a dozen varieties, all curious and colorful. Unless the seed comes from a good source, the special strains may not come true.

However, you can put aside the stories one hears about the promiscuity of the vine crops: muskmelons crossing with cucumbers, or watermelons crossing with pumpkins. Varieties within species cross readily, but genera will not cross, and most species will not cross with other species. This applies to (Continued on page 386)

TODAY CHILDREN MUST BE WARNED TO KEEP OUT OF AND AWAY FROM WATERS FROM WHICH THEIR GRANDFATHERS AND FATHERS COULD SAFELY DRINK

That pollution problems cannot be met by existing laws and policies is proved by—

The Fate of Beargrass Creek

Photograph by Elizabeth Bedinger

By TOM WALLACE

STREAMS, lakes and ocean estuaries that constitute the waters of the United States were, largely within the memory of living men, as pure and sparkling as when Indians occupied the land.

Increasingly streams and lakes are befouled and poisoned, on the Atlantic Seaboard, in the Mississippi Basin, on the Pacific Coast. Ocean beaches and estuaries are polluted. Opponents of direct dealing with the problem by Congress cry "State Rights". Eager fighters for pure water insist that water, governed by force of gravity, does not stop at State boundaries. They declare that the biological importance of pure water is greater than the political importance of State Rights.

The polluters' lobby fought every pure water bill introduced in Congress until the Barkley-Spence bill was introduced. Opponents of pollution declared the bill toothless. Representative Carl Mundt of North Dakota introduced an amendment to prohibit new sources of pollution without sanction of a designated agency of Federal Government. Water polluters—and Senator Barkley—turned against the bill as amended. The House declined to accept it without the amendment. The Senate, under Mr. Barkley's guidance, declined to accept it with the amendment, and the bill died in consequence.

Senator Barkley and Mr. Spence are Kentuckians. Senator Barkley is majority leader at his end of the Capitol.

Advocates of real pollution control point to a Kentucky case, which, they contend, shows the futility of waiting upon forty-eight States to pass and enforce effective anti-pollution laws.

Beargrass Creek enters the Ohio River, the central water course of the Ohio Valley, at Louisville. Dr. Thomas Parran, Surgeon-General of the United States, said, several years ago, that the Ohio Valley had between it and epidemics of water-borne diseases "only a thin line of resistance", despite purification plants.

Beargrass, in Louisville, is an open, evil-smelling sewer conducted through a concrete channel in a course artificially created to divert it from midtown. The stream bears the name of one of the historic sections of Kentucky. Stump orators spoke of the State as "the Bluegrass, the Beargrass, the Pennyrile and the Purchase" a generation ago. The Kentucky mountains were so little developed that they were not then considered along with these four grand divisions.

East of Louisville's closely-built sections is Cherokee Park. East of Cherokee Park, and adjoining that reservation, is Seneca Park. The two parks include nearly 1000

acres of rolling land traversed by the serpentine course of Beargrass Creek. East of the parks rural Jefferson County is watered by Beargrass Creek.

When, in 1891, the tract that now is Cherokee Park was acquired by Louisville, the Board of Park Commissioners described it as being "washed by the limpid waters of the Middle Fork of Beargrass Creek", and as being "of entrancing beauty. . . . Great trees hang over and dip their leaves into the clear stream. . . . Its waters are as clear as the rivulet that gushes from limestone hills."

Seneca Park is mostly rolling meadowlands. Along the banks of Beargrass it matched Cherokee Park in "entrancing beauty".

Beargrass Creek in Cherokee Park has been for a good many years so polluted that Louisville children—whose parents waded and swam in it when they were children—have been warned by the municipality not to so use it.

Upstream from the parks are numerous country estates of considerable expanse. Oxmoor, the ancestral home of William Marshall Bullitt, a Louisville lawyer and former Solicitor-General of the United States, comprises 1000 acres. The family residence, built in 1787, is approached from Highway 60 through an avenue that Beargrass Creek crosses.

Next Oxmoor, upstream, lies the slightly larger estate of Mrs. Alvin T. Hert—Hurstbourne Farms. The manor house, as originally built, was very beautiful.

Still farther upstream lies Plainview Farms, the 500-acre rural plaything of Robert C. Tway, coal mine operator in Harlan County, man of prominence in Louisville affairs. Plainview Farms Dairies have handled the milk of Mr. Tway's blooded herd, plus, at times, milk from seventy other herds, marketing it in Louisville at retail.

Mr. Bullitt, after, he contended, ineffectual efforts to get relief otherwise, filed a suit against Mr. Tway. The dairy, he said, so polluted Beargrass Creek that, where it crossed Oxmoor, fish could not live in it; children could not safely swim or wade in it; mules would not drink it. He charged that pollution was so heavy near the Tway estate that the scum was four inches thick.

The Louisville Board of Park Commissioners, the State Board of Health, the Jefferson County Board of Health and the City of Louisville joined Mr. Bullitt and his wife, Nora I. Bullitt, as petitioners.

The record reveals that the State Board of Health, nine years before the suit was filed, discussed with Mr. Tway alleged pollution of the creek by his dairy. The record does not reveal, and nothing indicates, that any of the petitioners sought abatement of pollution through a Kentucky statute which provides, for each separate act of water pollution, a fine of not less than $10 or more than $100, and imprisonment in the county jail for not less than thirty days or more than six months.

A Louisville newspaper, believing each day's pollution a separate offense, figured that if the petitioners' charges were true, and if the maximum penalty for each offense in one year were inflicted, the master of Plainview Farms would go to jail for 182 years and pay a fine of $36,650. So, if the period of pollution were ten years and if maximum penalties for each day's offense were inflicted, he would be jailed for 1825 years, and fined $366,500.

That nobody invoked the anti-pollution law may be attributed to a feeling that in the State that sends Mr. Barkley to the United States Senate, and Mr. Spence to the House of Representatives, it is futile to prosecute a man of means and position for polluting water.

Experience shows that it is almost a waste of time to try to convict anyone of such an offense. Courts are so unconcerned about pollution that if anyone is convicted the minimum fine and no jail term may be expected.

"Mr. Tway's pollution of Beargrass Creek (as hereinbefore described) has not been stopped, nor lessened; and it (the creek) is today in worse state of pollution than it has been at any time in the last nine years," said the petitioners.

"On December 6th, 1933, the State Board of Health resolved and notified Mr. Tway, in writing, that the improper disposal of sewage and waste from the property owned by him was a nuisance, source of filth . . . and requested him to abate the nuisance."

"Requested", be it noted!

When the suit was filed, petitioners stated, the stream was "black, vile-smelling, putrid . . . an open sewer working with fly and mosquito larvae, productive of sewer worms".

Kentucky has a Conservation Commission whose head, the Conservation Commissioner, receives $4000 a year. At no time did the Conservation Commission attempt prosecution during the progress of the discussion that was climaxed by the civil suit. The suit ended when Mr. Tway's attorneys agreed to an injunction forbidding further pollution of Beargrass Creek.

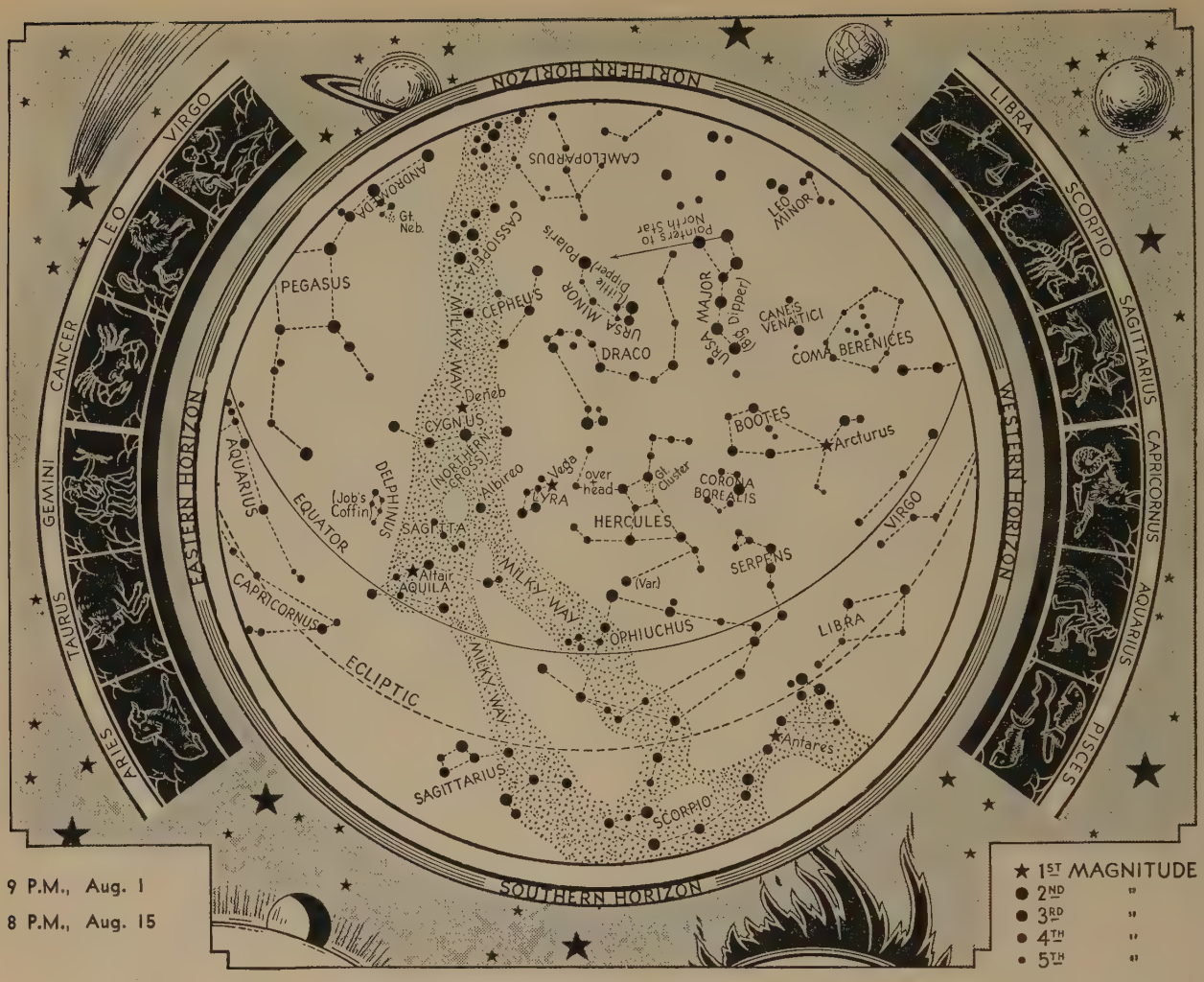
This is a conspicuous, yet typical, example of how states, or some states, meet the pollution problem.

Those fighting pollution hold that not within a thousand years would forty-eight States, acting separately, or acting in groups under compacts, end pollution of United States waters. It is not contended that the Mundt proposal, now incorporated in a pending pollution control bill, would be more than a step toward ending the willy-nilly use of streams, lakes, estuaries, as sewers that cost nothing—nothing but human life, wildlife and sacrifice of water sports.

Biological values of pure water are many. One is the influence upon the lives of successive generations of young people. Bathing in crowded chlorinated municipal pools does not take the place, as a constructive influence upon human lives, of pure water at ocean beaches, or in streams and lakes bordered by forest trees.

Every generation of people of the United States prior to the present one was made up largely of boys and girls who could safely dabble, and hopefully fish, in the hundreds of thousands of miles of streams that gathered their clean waters from forest and field.

Today health boards must warn children and adults to keep out of and away from streams from which their grandfathers and fathers could safely drink the unpolluted water. Such has been the fate of Beargrass Creek.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

August-September Skies

By ISABEL M. LEWIS

THE outstanding news of the heavens for these months will be the fine eclipse of the moon that will occur on the night of August 25-26 and will be total for one hour and thirty-four minutes. This is within ten minutes of the greatest possible duration of the total phase of a lunar-eclipse. The beginning of the eclipse will be visible in all parts of North America except the extreme western and northwestern parts, in Europe, Africa, the Atlantic Ocean, South America, and the southeastern part of the Pacific Ocean. The ending will be visible in part of the British Isles, southwestern Europe, western Africa, the Atlantic Ocean, North America except the extreme western part of Alaska, South America, and the eastern part of the Pacific Ocean. The moon will enter the earth's shadow on August 25 at 10:00 P.M., Eastern War Time. Total eclipse will begin when the moon is totally within the shadow of the earth at 11:01 P.M., and the total phase will end at 12:35 A.M. when the moon begins to emerge from the shadow of the earth. It will be out of the shadow completely at 1:35 A.M. August 26. In Central War Time all the phenomena will occur one hour earlier than in Eastern War Time; in Mountain War Time two hours earlier; in Pacific War Time three hours earlier. The total phase of this eclipse will be observable in all parts of the United States; but in the northwestern part of Canada and part of Alaska the moon will rise totally eclipsed.

A total eclipse of the moon, unlike a total eclipse of the sun, can be seen over half of the earth's surface at a time and the rotation of the earth during the period of the eclipse brings additional parts of the earth's surface into view of the eclipsed moon. A total eclipse of the sun can be seen only within a narrow strip on the day side of the earth. So, as a result, total eclipses of the moon are much more widely observed than total eclipses of the sun. Another marked difference between total eclipses of sun

and moon is that the surface of the sun is completely hidden from view by the moon during total eclipse; but during the total eclipse of the moon, although the moon is completely within the shadow of the earth, it still shines with a strange coppery light. This is because of the fact that sunlight shines through the part of the earth's atmosphere that lies above the sunrise and sunset regions of the earth at the time and forms a brilliant ring of light as seen from the side of the moon turned toward the earth. This light is bent into the earth's cone of shadow and illuminates the surface of the moon with a weird light. In some eclipses the surface of the moon is illuminated much more brilliantly than others, depending upon the condition of the earth's atmosphere, transparency, cloudiness, etc., at the time of the total phase. Also it will be noted that the illumination is irregularly distributed near the edge of the moon, some parts being much more brightly illuminated than others.

Lunar eclipses are of little scientific value as compared with total eclipses of the sun, but they do afford a chance to determine the temperature of the surface of the moon and the drop in radiation from its surface when the sun's rays are shut off.

There will be a small eclipse of the sun on August 11, but only five hundredths of the diameter of the sun will be covered by the moon at maximum eclipse and it will be visible only in Antarctic regions.

Another partial eclipse of the sun will occur on September 10, the magnitude of greatest eclipse being fifty-two hundredths of the sun's diameter. It will be visible in northeastern Alaska, northern Canada, Baffin Land and Greenland in the early morning, and in Iceland and the British Isles and Europe later in the day. The eclipse will occur at sunset in eastern Europe, in part of the Mediterranean, and Italy.

This summer there may be some search made for a new planet in the constellation of Scorpio near the ecliptic. From a study that Dr. R. S. Richardson of the Mt. Wilson Observatory has made of the effect of Pluto upon the motion of Halley's Comet he has come to the conclusion that the delay of about three days that was observed in the return of this comet to perihelion in 1910 may be due to the action of an unknown planet. It is too great to be caused by the attraction of Pluto upon the comet. The effect could be explained by the assumption of the existence of an unknown planet, of about the same mass as the earth, which revolves around the sun *in the plane of the orbit of Halley's Comet,* and at a distance beyond the aphelion point of the comet's orbit of about ten million miles. This aphelion point of the orbit of Halley's Comet lies at a distance from the sun of about 3,275,000,000 miles. A planet at this distance no greater in size than the earth might have escaped detection especially since its orbit would be very highly (Continued on page 386)

An Uncommon Flower from Mexico

By BERTHA McKEE DOBIE

IN February, 1933, I stood in the beautiful garden of a "North-American" woman in Jalapa, Mexico. Primroses of England and orchids of Mexico met there in international accord. It was a lush and lovely garden, brought to perfect bloom by the daily "chipi-chipi" mist characteristic of the region half-way down from the high central plateau to the sea.

"This," said my friend, "is called here 'Porfirio Diaz's flag'. I know no other name." The flower was brilliant red, with just a suggestion of green and white. It looked like an orchid, and it did not look like an orchid.

I brought a bulb back to "the States" and planted it in my garden, where, blooming variably in spring, summer, or fall, it continued to be known as "Porfirio Diaz's flag." Then, in the summer of 1940, I saw my strange flower blooming in the Dallas garden of Mrs. Gross R. Scruggs, former president of the National Council of State Garden Clubs. She knew its name—*Sprekelia formosissima.* Later an acquaintance living in the Rio Grande Valley told me that a Mexican had brought some of the same bulbs to her from the mountains of his native country, and that he called them "flag of Mexico." Whether called for the great dictator or for the country he long ruled, the flower is exciting and bold. L. H. Bailey lists one species only, it is native to Mexico.

The plant belongs to the Amaryllis family. Like most members of that family, it is a garden plant for the South and a hothouse plant for the North. It is more nearly hardy than *Hippeastrum.* Whether grown in open ground or in a pot, the bulb should be set barely below the surface of the soil. No amaryllis blooms freely if planted deep. The soil should be a rich, loose loam. It offers a new horticultural adventure for gardeners seeking oddities.

SWEETBRIER

By U. C. DEIKE

Queen of a wilderness of waste,
Regal, triumphant, clean and chaste,
You proudly take supreme command
And transmute glory from base sand!

In quiet green, your dainty dress,
Pink-petal-trimmed, makes loveliness
Apparent to dull, untrained eyes
And tempts the skill of artists wise.

Guarded by bayonets of thorn;
You match the brightness of the morn
As Sirius and Sun conspire
To conquer through intense desire.

Frail, yet undaunted by the haze
Of summer's hottest sultry days
That wilt the less courageous plants,
You, with sly zephyrs, gaily dance.

Sweet Eglantine! You make a shrine
For vagrant footsteps, such as mine.
I bow in reverence to share
The incense of a rose so fair!

DRUG PLANTS AND WAR STRATEGY

(Continued from page 349)

Similar national planning has been instituted with respect to henbane, officially called *Hyoscyamus,* a drug plant related to belladonna and similarly useful. There is a special problem, however, with respect to henbane, for the variety commonly used takes two years to mature. But there will be no shortage between now and the 1943 harvest. For enough henbane escaped from various 1917 plantings, and continued to grow wild, to supply our 1942 requirements.

Other drug plants now obtained domestically in considerable quantities include digitalis, the heart stimulant derived from the dried leaves of the common foxglove; Levant wormseed, from which comes the worm medicine santonin; and ergot, a drug useful in lessening the hazards and shortening the pain of childbirth. Ergot is a fungus parasitic on damp rye. It is not grown, but sorted out of rye screenings formerly cast aside by the flour mills, breweries and feed companies. None of these, however, compares in importance or in interest with the drug of dreams, long famed in song and story, the dried juice of the oriental poppy.

Opium is the Dr. Jekyll and Mr. Hyde of the drug world. Together with its many derivatives, it can be more destructive of body and soul than the worst diseases. But when legitimately used by the physician for the relief of acute pain, opium, morphine, and codeine are among the most useful drugs in the dispensatory—especially in time of war. After a battle or air-raid, morphine is routinely administered to those wounded, and a red *M* marked on their foreheads with dermatographic pencil or lipstick to indicate that the dose has been given.

A particular species of poppy, *Papaver somniferum,* is the source of commercial opium. The crude drug is simply dried juice collected from the unripe seed-pod or capsule of the poppy. Japan has plenty of opium, and is using it more ruthlessly than poison gas against civilian populations. Evidence has accumulated that the Japanese are systematically inculcating the opium habit in the areas they have conquered, as part of a concerted plan to destroy morale, to undermine resistance, and to swell the profits of military conquest.

Picture a small Japanese garrison holding some town in China, Burma, or the Philippines, and backed up by representatives of the Japanese banking and industrial monopolies bent on exploitation. Such invaders face resistance—perhaps organized resistance, but more probably the passive individual noncooperation which the conquered have always exhibited towards their conquerors. To destroy it, the Japanese have brought along a new weapon, one which can break the sternest will and reduce to impotence the strongest spirit.

Opium is made freely available, and Japanese agents popularize its use among those weak enough to turn to it for solace. Then, when the habit has sufficiently spread, the screws are clamped down. The devastating drug can still be had, but only on Japanese terms. Once the habit is established, men will lie and cheat and steal for opium. They will betray their brothers and murder their leaders.

"Wherever the Japanese Army goes," says Commissioner of Narcotics Harry J. Anslinger, "the drug traffic follows. In every territory conquered by the Japanese, a large part of the people become enslaved with drugs."

Peasants are forced to grow the deadly poppy by an ingenious revenue system that requires them to pay their taxes in raw opium. A single Japanese narcotics factory in Kalgan, Manchuria, produces fifteen times as much of the opium derivative, heroin, as the world needs. In the four northeastern provinces of occupied China, the number of known drug addicts increased by 12,500,000 during the first three years of Japanese occupation.

Such is the horror, sometimes called the "Greater East Asia Co-Prosperity Sphere," which Japan is loosing on a hemisphere scale.

In the United States opium production is prohibited by law; Turkey and Jugoslavia have heretofore supplied the bulk of our needs. Since World War I, our chief problem has been not to procure the drug but to suppress its illicit use. The Treasury's Bureau of Narcotics has waged relentless war against unlicensed importers, distributors, and dispensers, while the U. S. Public Health Service has operated "narcotic farms" where, instead of opium being grown, "dope" addicts are cured.

The first effect of World War II has been to disrupt the bootleg channels of entry for opium and its derivatives, and thus to dry up the supply illegally available. But as the Government's problem of cutting off illegal use of the drug has diminished under pressure of war, its problem of procuring an adequate reserve and a continuing source has increased.

As in the case of quinine, the U. S. Treasury did its wartime opium shopping early. Before the Mediterranean was closed to our shipping, the Treasury procured enough of the crude drug to take care of our normal medical needs for a considerable period, and some shipments have been flown out since. In addition to the Treasury reserve, the Army has its own stockpile, accumulated from illicit drugs seized and confiscated by the Bureau of Narcotics.

But even if stockpiles are exhausted, there is no danger of an opium shortage. Enough poppy seed is being held in reserve to grow all the opium needed by the United Nations. The Department of Agriculture knows how to grow the plants either summer or winter, in certain hot, dry portions of the continental United States.

Producing opium is easy; it is the thought of controlling its distribution that troubles the midnight hours of narcotics strategists. The price per ounce is so great, and the spread between the medicinal and black market prices so tempting, that even the most cunningly devised system of controls may leak like a sieve if vigilance is relaxed for a moment.

Government experts believe that they can grow sufficient opium without simultaneously supplying the illicit traffic. Just what their plans provide is as closely guarded a military secret as the location of our overseas air bases or the details of our anti-submarine campaign. But you can rest assured of two facts. First, there will be no shortage, military or civilian. Second, little if any will spill over into illicit channels. While the Department of Agriculture welcomes Dr. Jekyll, the Bureau of Narcotics will keep out Mr. Hyde.

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U. S. Naval Observatory, Wash., D. C.

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TO THE EDITOR

Preserve Endangered

Dear Sir:

We are being confronted with a very serious matter relative to conservation in Louisiana that should come to the attention of all persons interested in conservation. That is the destruction of one of the last habitats of the almost extinct ivorybilled woodpecker. That area is comprised in the Singer Game Preserve, a privately-owned rare stretch of virgin forest located in Madison Parish. It has for a number of years been policed by our Conservation Department. This area abounds in natural wildlife and possesses some of the largest trees of those species that occur in the type of bottom land found in the region. It is most imperative that all scientific organizations and individuals use every means at their disposal in trying to save at least part of this acreage from the cutting of timber now taking place. The area has been maintained for twelve years as an inviolate refuge for wildlife.

HENRY B. CHASE, JR.

New Orleans.

(Thorough study of this area has been made by several members of the National Park Service and by a scientist for the National Audubon Society. Recommendations have been made that the preserve be acquired and established as a National Monument preserving a typical area of outstanding biological importance. A bill has been introduced in Congress by Senator Ellender of Louisiana to create the Tensas Swamp National Park by preserving an area not exceeding 60,000 acres. While the region hardly fulfills requirements for National Park designation, it certainly should be saved. It is to be hoped that, with the support of conservationists, Senator Ellender will push his bill to the end that the area may be set aside in the proper category into which it falls. EDITOR.)

Walking in the Rain

Dear Sir:

In a recent article E. Laurence Palmer asks, "Did you ever walk in the rain?" I have lived on a farm all my seventy years and so have had to walk in the rain many times. There is a certain joy in fixing fences on a day in June with raindrops pattering on your back, the ragged robin and buttercups in full bloom but half hidden in the tall grass, the never silent dickcissel keeping the other birds singing. When you have to get the cows out of pasture on a stormy day, rain streaming down your face, your clothes soaked, there is a feeling of exhilaration. Yes, I've walked in the rain.

C. ROOT

Ellsworth, Minn.

Hawks and Crows

Dear Sir:

An editorial in the *Tuscaloosa News*, reprinted in the *Alabama Journal*, describing in laudatory terms the exploits of one J. H. Allen, self-appointed "hawk exterminator", seems to indicate the need of education about hawks in this State. I enclose a letter sent to the editors of both newspapers in the hope that it may do some good. This letter may interest you.

S/SGT. WILLIAM Z. HARMON

Maxwell Field, Ala.

(Your letter does interest us, Sergeant, so much so that we feel the facts it contains should be useful to many. Below is what you wrote. EDITOR.)

It seems that Mr. Allen's "hawk and crow extermination" campaign; "Hawk War", or whatever he chooses to call it is somewhat out of tune with the times. If Hunter Allen is a perfect marksman, which is entirely unlikely, and assuming that he has killed 470 hawks and 365 crows, as is stated, a little simple addition shows us that he has wasted more than enough ammunition to kill exactly 835 Germans, Italians or Japs. He has used more than enough powder to sink an enemy destroyer and enough lead to start building the batteries that are necessary to run a submarine under water—and all that just this spring. Perhaps the time he has wasted in carrying on his private war could have been put to better use in some defense plant in a war for humanity instead of one against it.

Omitting the crows, whose worth is still somewhat a question of debate among those who dedicate their lives to such things, let us turn our attention briefly to the amount of "good" Mr. Allen's campaign has brought to the communities in and around which he has carried on his depredations.

Of all the fifteen or twenty common species of hawks which inhabit the United States only three are considered harmful or non-beneficial: The sharp-shinned hawk, the Cooper's hawk, and the goshawk, and these seldom ever reach points as far south as Alabama. Some of the hawks which are common to Alabama and other southern states are: the marsh hawk, Harris's hawk (occasional), red-tailed hawk, red-shouldered hawk, Swainson's hawk, broad-winged hawk, and rough-legged hawk, all of which have been given the local name of "hen or chicken hawk". No name could be more in error. The amount of poultry that these hawks destroy is so slight as to be negligible. Their main food consists of mice, rats, shrews, moles, skunks, snakes, grasshoppers, crickets, "locusts", and other injurious insects, mammals and reptiles.

A pair of nesting hawks will destroy more than 1000 mice and rats during the nesting season alone, and a nesting season lasts only about three months. That would be 500 rats and mice each for the 470 hawks that Mr. Allen was so thoughtful as to destroy, which means that they would have killed and eaten 235,000 rats and mice during the three months' nesting period. If each pair of hawks had been allowed to live and each pair had raised the average family of three young there would have been 705 more hawks to kill rats and mice during the remainder of the year. If you want to go ahead and figure the number of rats that would have been destroyed, the privilege is yours, but for the moment let us watch those 235,000 rats that were saved by killing the 470 hawks. A rat will eat at *least* one-half pound of grain per week—more if he can get it. That would be 117,500 pounds of grain per week for twelve weeks, which is 1,410,000 pounds of Alabama grain eaten out of the pockets of Alabama farmers. That doesn't count the other damage done by the rats such as eating the blackberry crop, ringing fruit trees and the unsanitary condition they cause by their presence. Likewise, the eating of the rats is not all the good the hawks would have done. Consider the insects that destroy the crops from above the ground, the mammals and worms that destroy it from below the ground. Consider the thousands of things that must be considered before a species of any form of life is condemned to extermination. Consider the thousands—yes millions of dollars spent on research by the U. S. Department of Agriculture, the American Nature Association, Audubon Society, various State Agriculture Departments, and others.

If Mr. Allen would deny himself the price of three or four shot-gun shells and write a few letters to some of the above mentioned organizations requesting the latest information about his hawks, even he might find something to consider.

The Sacajawea Expedition

Forward the Nation. By Donald Culross Peattie. New York: G. P. Putnam's Sons. 1942. 281 pp., with 2 end-paper maps of the Lewis and Clark Expedition and a 5-page note on the sources for material on that expedition. $2.50.

When Napoleon's new order for Europe had developed to about the same point that Hitler's has now reached, the Lewis and Clark Expedition that President Thomas Jefferson then sent out to explore his Louisiana Purchase probably seemed of trivial importance in world history. Quite otherwise it seems now to Donald Culross Peattie and the readers of his *Forward the Nation.* Sketching the progress of that expedition against its European background, Mr. Peattie develops vividly the impression that the new world expansion signified by that expedition was of equal historic import with Napoleon Bonaparte's conquests. Probably Herr Hitler as he faces the might of the now expanded and developed New World would be among the first to agree with him.

Thus Mr. Peattie has again made a subject of his own enthusiasm seem of great meaning to all of us and, characteristically, has written of it in such a fascinating style that few readers will be long in going from the first page of the book to its end. Yet a still more striking expression of his genius as a writer again gives deep emotional human interest to his tale—an interest centered in the personality of a young Indian woman whose presence made the expedition a success. She was Sacajawea, whose name meant Canoe Launcher.

It is a further tribute to Mr. Peattie and his book that he has accomplished his purpose without creating fictional characters but simply by revealing the romance that he saw inherent in his subject and bringing to life the actual men and the women of whom he writes. *Forward the Nation* should have many readers, all of whom should then be better Americans, and most of them will ever afterwards think of the Lewis and Clark Expedition as the Sacajawea Expedition.

"It was she who gave, liberal as earth, to her captains, to her children, her people, our own, and now to ourselves. For the thought of her still lifts the eyes up, from the stones before our feet, to find the shining mountains, a hard way but a right one. It is for us to be brave enough and strong enough to take it."

H. Z.

Garden Harvest Shows

Twenty thousand flower, vegetable and fruit shows during the month of September to raise $2,000,000 for the joint benefit of the Army Emergency and Navy Relief Funds is the goal of the National Citizens Committee of the Navy Relief Society. A large number of national organizations in the horticultural field have joined in organizing state committees, and several hundred groups have actively endorsed the project. The funds will be raised from admission prices, eighty-five percent of the gate receipts of the shows to go into the joint fund.

Indiancraft

Indiancraft. By W. Ben Hunt. Milwaukee. 1942. Bruce Publishing Company. 124 pages. Illustrated. $2.75.

The author of this book is an artist and handcraftsman who has devoted many years to Boy Scout work, hobby direction and study of Indian life. In this volume he has compressed forty-five articles on Indiancraft gathered from many half-forgotten sources of Indian lore. If you would like to know how to make an Indian buckskin shirt; how to manufacture a decorative belt; how to prepare and operate a bow drill; how to master the lazy squaw stitch for fabricating coiled grass baskets, or a lot of other interesting items of craft, you will find them in this book. Beside the instructions given, the author has illustrated each item of Indiancraft with clear and practical drawings that make the production of these things a relatively simple task. This should be a most valuable book for camps, schools, Boy and Girl Scouts, Campfire Girls, and anyone who likes to make things with his hands.

Photo Contest

Announcement of a photographic contest open to all members of the Camp Fire Girls organization, including Blue Birds and Horizon Club members, has been made by the national headquarters. The contest runs to September 15, 1942, and the judge list is a distinguished one.

Deer and Antelopes

Horns and Antlers. By Wilfrid S. Bronson. New York. 1942. Harcourt, Brace and Co. 143 pages. Illustrated in color and black and white by the author. $2.00.

This is an attractive, well-written and informative book for the younger readers on the lives and habits of the deer, antelopes, moose, mountain goats and others of the antlered tribe in North America. It is the latest addition to an excellent group of Nature books by the same author.

Botany Text

Plant Life. By D. B. Swingle. New York. 1942. D. Van Nostrand Company. 457 pages. Illustrated. $3.00.

This is a second edition of this excellent and successful botany textbook, first published in 1935. While the new edition has not been changed from the original and fortunate plan of treating plants as living things, it does include somewhat more natural history than was contained in the original volume. Some new illustrations have been added and others improved.

More Life Histories

Life Histories of North American Flycatchers, Larks, Swallows and Their Allies. By Arthur Cleveland Bent. Washington, D. C. 1942. U. S. Government Printing Office. 555 pages. 70 plates. $1.00.

Published as Bulletin 179 of the Smithsonian Institution of the United States National Museum, this is the fourteenth in the series of bulletins on the life histories of North American birds by Dr. Bent. This volume carries on the monumental and invaluable work commenced by the author with the publication in 1919 of the first bulletin on the diving birds. This latest volume follows the general plan of its predecessors.

Civic Annual

American Planning and Civic Annual. Edited by Harlean James. Washington, D. C. 1942. American Planning and Civic Association. 292 pages. $3.00.

This annual publication is a valuable record of progress in the fields of planning, parks, housing and neighborhood improvement. It contains significant articles and reports grouped on a national, regional, state and local basis. Also included are the principal papers delivered at the 1941 meetings of the National Conference on Planning and the National Conference on State Parks. A most valuable compilation any year, it has particular significance in these days.

Soap Lake Birds

Soap Lake lies some sixty miles below Grand Coulee Dam in eastern Washington. At the lower end of the lake are situated hotels, mud baths and a sanitarium for the treatment of the rare Berger's disease. The upper end of the lake is noted for its bird life, a fact borne out in a report from L. Roy Hastings of the Seattle Audubon Society and editor of the *Seattle Wren,* the Society's publication.

One of the most interesting bird residents is the avocet. (See Nature Magazine, May, 1942, page 249.) Mr. Hastings saw fourteen of these birds stirring up the mud for food. He adds:

"Along with the avocets, and almost in the shadow of them, one might say, were thirty or forty least sandpipers—busy little chaps. When their big cousins would spring into the air they would go circling away with them. With the exception of killdeers there were no other shore birds to be seen. But out a couple of hundred yards from shore were a dozen or more western grebes.

"Another species that seemed to resent my investigations was the swallow, myriads of which nested in the shale-like cliffs along the roadside. Western meadowlarks were singing in the near-distance and mourning doves sent up their sorrowful calls from the barren cliffs above. It seemed strange to me that these birds of the green meadows and lush orchards were here in the sage, desert grass and greasewood. Brewer's sparrows anxiously watched from their perches on the same cliffs. Among other birds seen were unidentified hawks sailing high in the distance, willow goldfinches, young Arkansas kingbirds and horned larks. The kingbirds had been reared in an electric transformer box on a pole in the main street of Soap Lake."

Nature Experiments

Two simple experiments for our younger readers are suggested by Marian Galusha of Fresno, California. The necessary equipment consists of an assortment of strings and yarns of various colors, each about six to ten inches in length. Miss Galusha suggests:

"For *EXPERIMENT A:* Have an assortment in one bunch or hank, like a skein of yarn with ends cut. Put a small rubber band around the middle of the hank and fasten the band to the top of a post or limb where you can watch the birds as they find it. Be sure they can draw a thread out of the hank rather easily, especially at first. Later you might make it a bit more difficult for them.

"For *EXPERIMENT B:* Provide a number of such hanks, all of one color in one hank and all of another color in another hank and so on. Have the same number of threads in the yellow hank as in the red hank and in each of the other colors used.

"Try out *EXPERIMENT A* one day, at least, before you start *EXPERIMENT B.* Then it might be fun to try both at the same time. See if you can answer these questions. Also record any other observations you have made:

"What kind of birds did you see take from each bunch? Which colored hank disappeared first? What bird seemed to like a certain color best? Which color seemed least attractive to the birds? Did you see the same bird or birds return for more? Which experiment gave you the most fun to watch? It is said that bees like blue flowers best of all. Do you think birds have favorite colors also?"

Poison Ivy

In comment on our poison ivy eradication article of October, 1941, George H. Crosbie of Boston passes on some advice on both control and remedies for poison. He writes:

"The way I have found most successful is to use a grub hoe to get the runners started, then pull them up roots and all. Where the vines are in a stone wall and cannot be pulled out they can be saturated with kerosene and burned. Most of this work I do in August with my sleeves rolled up, wearing nothing but cotton gloves. Be careful not to rub your face or eyes when working with poison ivy.

"After you are through working with poison ivy, immediately wash all exposed parts thoroughly with yellow laundry soap, and then an application of alcohol.

"Since I have followed this method I have not been poisoned except when I was working in the woods and did not realize that I was near poison ivy vines or its roots. It is a good idea to keep potassium permanganate on hand whenever you are working with or near poison ivy. The minute you feel any effects from it apply potassium permanganate several times during the day. This will leave a brown stain which will soon wear off or can be removed by the use of oxalic acid. Many articles say to stay out of the smoke in burning poison ivy. I have been saturated with the smoke many times with no ill-effects if I follow the soap and alcohol application."

Correspond?

Miss Ruth Bishop, 512 East State Street, Ithaca, New York, would like to correspond with others interested in ecology, particularly the interrelation of plant and animal ecology.

THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

Professor Baby Snooks, D. Pd.

Many of us have listened over the radio to the trials and tribulations of Baby Snooks and her distracted, paternal parent who is forever pestered with that most embarrassing of all questions, "Why, Daddy?" We may be inclined to look on Baby Snooks as pure entertainment, but those of us who consider ourselves honest teachers should recognize the teaching value of the standard technique that she follows.

When we consider the possibility of employing Baby Snooks' teaching methods in class, we should at least think about the effect it may have on the pupils—and on the teacher. The "I tell you" system employed by most teachers shifts the burden of learning wholly from the teacher to the pupils. This relieves the teacher of learning anything other than what she was taught in her preparatory school. It also guarantees that the teacher will *not* grow but will stay about where she is indefinitely. It also guarantees that a barrier that may exist between teacher and pupil will remain firmly established. The "I tell you" system may relieve the teacher of looking up new questions that have been raised, and leave her free to help in rationing sugar, keeping dates, or attending first-aid classes. We need to have sugar rationed. We need teachers trained in first-aid and teachers need to have dates, but the school is established fundamentally for the improvement of the pupils. The pupil who does not feel free to ask "Why?"—or who does not ask "Why?"—is probably not making much progress in mastering the problems he must face.

We do much talking about "Education and Democracy," and the value of education to the "community, the state and the nation." I contend that Baby Snooks and her "Why?" technique offer us one of the best bases for the kind of education needed in a democracy, whether in the community, the state or the nation. (I use those phrases about democracy and community, state and nation so that you will know that I am a Professor of Education.) The totalitarian nations are organized on the basis that the under dog need ask no questions, should ask no questions and, should he be so rash as to do so, may lose his job or wind up in a concentration camp. Even a democracy in war may be forced to policies that, for the "duration" at least, prevent embarrassing those in authority. But fundamentally, the democratic way is the Baby Snooks way, and we should not let it die out of our educational effort simply because in some departments of our experience it is best that we do not aid the enemy by getting our leaders in hot water. There are undoubtedly plenty of questions in world affairs that all of us would like to ask in these times. I cannot bring myself to ask a half-dozen that are crowding for expression as I write this. Should I be prevented from asking them long enough I probably would not want to ask them. But I am glorying in the fact that I live in a country where I have reason to believe that some day, when the present emergency has passed, I can join others in having a field-day asking, "Why?"

If we are living in a period in which we are forced to discipline ourselves and to delegate authority to others "for the emergency", there is every reason why now we should encourage inquiry and the habit of questioning in our children to the end that they may be in a position to carry on our traditions in a new world in which leadership will have to be recruited largely from those we are now teaching.

I recently heard a dean of a school of education say that he never listens to the news over the radio, and only glances at the headlines in the *New York Times* for a few minutes each day at the university club. He boasts that he has no worries about the present situation and is sure everything is coming out all right. I will bet that if he has any children he never lets them ask him "Why, Daddy?" and I am thankful that he is not responsible for training our fighting personnel, raising funds, or boosting production. What worries me is that he is training teachers and demanding public funds to support a philosophy out of step with the times. He insists that he must have sweet music over the radio when he shaves so that his emotions will not be upset and then he talks overtime so that no one has time to ask him "Why?"

There is not the slightest doubt that the "I tell you" technique of teaching is easier than that followed by Professor Baby Snooks. You can learn a song and dance to meet a great variety of questions, but if you teach Nature study from Nature "in the raw" that game will not work. The time will come when you will have to get down on your knees *with* your pupils and *with* them learn something you never knew before. Possibly what you learn is not to be found in any book in any library. It may not be considered in any standardized text, or appear in any orthodox curriculum. "Workshops" devoted to making new outlines from old ones will miss, probably completely, the thing that is in your front yard. But if you are to develop power, confidence and independent judgment, you must be able to do a little pioneering on your own. You must let not only your children and your pupils ask you again and again, "Why, Daddy?" but you must get the habit of asking the question of yourself.

If Baby Snooks' Daddy were a good teacher he might never answer her questions. Rather, he might show her how she could learn the answers. Then, I would have to write this about Professor Daddy Snooks instead of about Professor Baby Snooks. But Daddy Snooks never tries this system. He either tells her, gives up, or paddles the young lady. Any one of these three ways out provides a poor way for Baby to learn. The fact that she asks "Why?" so frequently guarantees that her parent will be kept on the alert, in a receptive mood, or "properly conditioned for learning", whichever expression suits your fancy. He is more likely to learn than she. She is the better teacher of the two.

I have looked over too many doctorate theses to criticize Baby Snooks too severely because of her English. I am sure that when she says, "I didn't do nothing" she must mean something else. But, whatever she means, she again shows herself a good teacher by letting her pupil do some of the work. I am sure that many teachers are too inclined to "carry the ball" themselves too much of the time. I am positive that it is one of many of my own faults. Of course, the teacher should not be guilty of doing nothing, but he can make himself equally useless if he tries to do everything. This applies to Nature teaching as well as it does to general educational practice.

At least a half-dozen correspondents in the last few days have written me asking how they can get to know their way around outdoors when they have no one to help them. Would this situation exist if these persons had been taught in their elementary science or Nature study to sit down anywhere, find a problem, attack it and get some answer suitable at least for the situation that exists. Somehow I feel that in the best taught class the teacher at least appears to be doing nothing while the pupils appear to be doing much. About the only way to develop this type of education is just to commence. Get yourself in hot water by asking yourself—or letting someone ask you—why some weed in your lawn grows where it does and in the manner it does. Go to the weed for the answer as well as you can. The answer—or at least one answer—is there, no doubt.

It is probable that this teaching technique has not been recommended to most elementary teachers in service. It is more likely that they have been filled up with a bunch of generalizations that they are supposed to recall and apply to a variety of situations, but this is not teaching and it does not help the pupil learn. Instead it develops a bunch of intellectual invalids leaning so much on their teachers that it is impossible for them to walk alone, let alone run and play in the realm where they can find the answers themselves through exercising their senses and whatever intellects they may possess.

The solutions that we may find may not be perfect but they may be satisfactory for our needs. And will we have fun asking others "Why?" and helping them find the whys behind our own questions? Well, I am not going to answer that question for you. All I ask is that you try it and see if it does not work. Try it on yourself. Ask such questions as "why is water muddy?", or "why do leaves break off smoothly from the twigs in fall?" You may not get the answer that would help you pass an examination in geology or botany but you will learn. If you learn in this way, I am sure you will join me in giving Baby Snooks the well-earned degree of Doctor of Pedagogy, whatever that means. Whether she gets the degree or not she is a better teacher than some who have it.

A preview of the next four of Dr. Palmer's educational inserts reveals that they will deal with garden flowers and the value of the garden in wartime (October); spiders of the home and field, their value and interest (December); the story of sound in Nature (February); eighteen birds of the West (April).

EMBLEMATIC PLANTS AND ANIMALS OF THE STATES

By FRANK MERRICK SEMANS

Biology Department, Youngstown College

The following list and statistics were prepared by the author to serve as a guide for an Ohio League of Nature Clubs Committee which is studying the possibilities for the selection of certain appropriate emblematic plants and animals for the State of Ohio. Several surveys were conducted for the accumulation of these data, and for every state, confirmation of all of the data cited here was given by the department of state or an agency selected by it.

The scientific names of the emblematic plants and animals, unless they are to be used as common names (for example, Kansas prefers *Helianthus* for wild native sunflower), are given here only when they are designated by the states and then only when there may be doubt as to the identity of the organisms that they represent. The names of the states are abbreviated in a conventional manner and are listed alphabetically. The symbols used are: bd., bird; fl., flower; of., official (some kind of state legislative enactment); tr., tree; unof., unofficial.

Ala.: fl., goldenrod, of., 1927; tr., none; bd., yellow-hammer, of., 1927. *Ariz.*: fl., giant cactus, or saguaro, of., 1901; tr., none; bd., cactus wren, of., 1931. *Ark.*: fl., apple blossom, of., 1901; tr., pine, of., 1939; bd., mockingbird, of., 1901; mammal, razorback hog, unof. *Calif.*: fl., golden poppy (*Eschscholtzia californica*), of., 1903; tr., Calif. redwood, of., 1937; bd., Calif. valley quail (*Lophortyx californica*), of., 1931; mammal, the extinct Calif. grizzly bear, unof.; insect, Calif. dog-face or dog head (*Zerene eurydice*), a butterfly, unof. ("entomologists", 1929). *Colo.*: fl., white and lavender columbine, of., 1899; tr., blue spruce, of., 1939; bd., lark bunting, of., 1931. *Conn.*: fl., mountain laurel, of., 1907; tr., none; bd., none (robin bill rejected Apr., 1941). *Del.*: fl., peach blossom, of., 1895; tr., American holly (*Ilex opaca*), of., 1939; bd., blue hen chicken, of., 1939. *Fla.*: fl., orange blossom, of., 1909; tr., none; bd., mockingbird, of., 1927. *Ga.*: fl., Cherokee rose, of., 1916; tr., live oak, of., 1937; bd., brown thrasher, of., 1931. *Idaho*: fl., syringa, of., 1931; tr., none; bd., mountain bluebird, of., 1931. *Ill.*: fl., native violet, of., 1908; tr., native oak, of., 1908; bd., cardinal, of., 1929. *Ind.*: fl., zinnia, of., 1931; tr., tulip tree, of., 1931; bd., cardinal, of., 1933. *Iowa*: fl., wild rose, of., 1897; tr., none; bd., eastern goldfinch, of., 1933. *Kan.*: fl., *Helianthus,* or wild native sunflower, of., 1903; tr., cottonwood, of., 1937; bd., western meadowlark, of., 1937. *Ky.*: fl., goldenrod, of., 1926; tr., none; bd., Ky. cardinal, of., 1926. *La.*: fl., magnolia, of., 1900; tr., none; bd., brown pelican, of., 1912. *Me.*: fl., white pine cone and tassel, of., 1895; tr., pine (Me. state seal, 1820); bd., chickadee, of., 1927. *Md.*: fl., black-eyed susan (*Rudbeckia hirta*), of., 1918; tr., white oak, of., 1941; bd., Baltimore oriole, unof. *Mass.*: fl., mayflower *(Epigaea repens),* of., 1918; tr., American elm, of., 1941; bd., chickadee, of., 1941. *Mich.*: fl., apple blossom, of., 1897; tr., none; bd., robin, of., 1931. *Minn.*: fl., moccasin flower, of., 1892; tr., none; bd., goldfinch, unof. *Miss.*: fl., magnolia, unof. (school children, 1900); tr., magnolia, of., 1938; bd., mockingbird, unof. (Miss. Federation of Women's Clubs, 1929). *Mo.*: fl., hawthorn, of., 1923; tr., none; bd., bluebird, of., 1927. *Mont.*: fl., bitter-root, of., 1895; tr., none; bd., western meadowlark, of., 1931. *Neb.*: fl., goldenrod, of., 1895; tr., none (American elm, of., Feb. 15, 1937, as of Nov. 12, 1941; "no of. tree," as of Feb. 11, 1942); bd., western meadowlark, of., 1929. *Nev.*: fl., sagebrush, of., 1917; tr., none; bd., mountain bluebird, unof. *N. H.*: fl., purple lilac, of., 1919; tr., none; bd., purple finch, unof. *N. J.*: fl., violet, of., 1913; tr., none; bd., eastern goldfinch, of., 1935. *N. M.*: fl., yucca, of., 1927; tr., none; bd., roadrunner, unof. *N. Y.*: fl., rose, unof. (school children, Arbor Day, 1891); tr., none; bd., none. *N. C.*: fl., dogwood, of., 1941; tr., none; bd., none. *N. D.*: fl., prairie rose, of., 1907; tr., none; bd., western meadowlark, unof. (planning bill to make of.). *Ohio*: fl., scarlet carnation (in memory of Hon. Wm. McKinley), of., 1904; tr., none ("Buckeye State"); bd., cardinal, of., 1933. *Okla.*: fl., mistletoe, of., 1893; tr., redbud, of., 1937; bd., bobwhite, unof. *Ore.*: fl., Oregon grape, of., 1899; tr., Douglas fir, of., 1939; bd., western meadowlark, governor's proclamation, 1927. *Pa.*: fl., mountain laurel, of., 1933; tr., hemlock, of., 1931; bd., ruffed grouse ("the game bird"), of., 1931. *R. I.*: fl., violet, unof. (public schools, 1897); tr., maple, unof. (public schools, 1894); bd., bobwhite, unof. (Audubon Society?). *S. C.*: fl., yellow jessamine, of., 1924; tr., palmetto, of., 1939; bd., mockingbird, of., 1939. *S. D.*: fl., pasque flower (*Pulsatilla hirsutissima*), of., 1903; tr., cottonwood (*Populus deltoides virginica*), unof.; bd., western meadowlark, unof. *Tenn.*: fl., iris, of., 1933; tr., none; bd., mockingbird, of., 1933. *Texas*: fl., bluebonnet, or buffalo clover (*Lupinus texensis*), of., 1901; tr., pecan, of., 1919; bd., mockingbird, of., 1927. *Utah*: fl., sego lily, of., 1911; tr., blue spruce, of., 1932; bd., Calif. gull, unof. (protected by legislative act). *Vt.*: fl., red clover, of., 1894; tr., none; bd., hermit thrush, of., 1941. *Va.*: fl., flowering dogwood, of., 1918; tr., none; bd., none ("robin", in former lists, but not recognized by the Secretary of the Commonwealth, Apr. 28, 1941 and Feb. 7, 1942). *Wash.*: fl., rhododendron, unof. (women's clubs, 1893); tr., none; bd., willow goldfinch, unof. (school children, 1932). *W. Va.*: fl., *Rhododendron maximum,* or big laurel, of., 1923; tr., none; bd., none. *Wis.*: fl., violet, unof. (school children, date?); tr., none; bd., robin, unof. (school children, date?). *Wyo.*: fl., Indian paint brush, of., 1917; tr., none; bd., western meadowlark, of., 1927.

Colchicine

Colchicine. By O. J. Figsti and Barbara Tenney. Norman, Oklahoma. 1942. University of Oklahoma Press. 32 pages. Illustrated. $.35.

This is a report on experiments with this poisonous alkaloid that is extracted from the underground parts of the autumn crocus and that does some strange and remarkable things to other plants. These experiments were made in cooperation with the University's Botany Department by laymen scientists during 1941 and have served to further the exploration of the possibilities of this substance.

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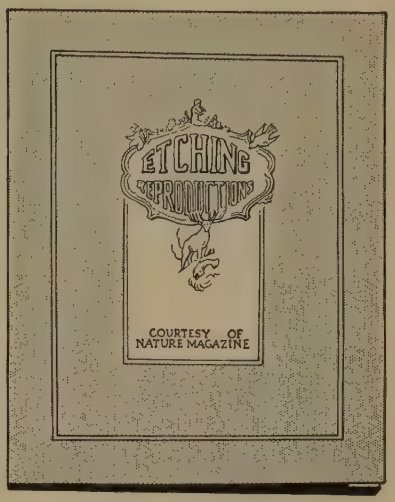

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GOURDS HAVE GLAMOUR

(Continued from page 375)

all of the vine crops so far as we know.

The warty gourds are especially fascinating, and the Turks-cap varieties are colorful and curiously shaped. The snake form comes in both cucumbers and gourds, and should not be confused. The dish-rag gourd is a curious phenomenon. Queen Anne's Pocket Melon is about the size of a small orange and is delightfully fragrant. Carry it around in your pocket, if you like, or use it to perfume your linen. There is almost no limit to the variations in shapes, sizes and colors of these fascinating vine fruits. Bulletin 356 from the University of Minnesota, *Gourds—Uses, Culture, Identification,* by A. E. Hutchins and L. Sandro, shows pictures of some sixty varieties.

Harvest gourds when they are fully mature, preferably on a clear, dry day. Sever the stem with a sharp knife, leaving it long enough to facilitate hanging up. Store in a dry, warm spot in the shade, so the sun will not fade them. Ventilation is important to prevent mold or rot. Never wash a gourd, or scratch the skin, for disease organisms may be introduced. An ancient Chinese practice, which has been revived rather unsuccessfully here, is the growing of gourds into curious shapes by enclosing them in a two-part plaster or other form. This is recommended only for advanced gourd fanciers.

When the gourds are thoroughly dry, they may be waxed with floor wax, shellacked, or painted. Waxing is preferable with most varieties, however, the other finishes being too glossy and lacking the subtle patina and color of the natural surface. If the insides of the softer varieties do not dry out promptly, a small hole can be pierced in each end with a darning needle to hasten the drying process. After drying, the outer skin may be scraped off the hard-shelled varieties, in case it has become discolored. Those to be carved into dippers and other utensils may be cut open before they are thoroughly dry. Cutting is then easier, and the curing process is hastened.

Strings of gourds, calico Indian corn, and red peppers or pine cones make fascinating decorations for living porches, patios and game rooms. Wooden or large pottery bowls of the small, decorative gourds will give an imperishable touch of color to a window or indoor table in winter, when flowers are scarce. Indeed, in the entire vegetable kingdom it would be difficult to find a family of plants that offers us so much in food, in utility and in beauty.

AUGUST AND SEPTEMBER SKIES

(Continued from page 379)

inclined to the ecliptic. The present position of this hypothetical planet under the conditions that have been assumed would be in the northern part of the constellation of Scorpio, and the search for it would be made in this region.

The annual return of the shower of meteors, known as the Perseids, which appear in greatest numbers about August 12, and may be seen in smaller numbers over a period of 25 days, will be observable under favorable conditions this year. New moon occurs on August 11 this year so there will be no moonlight to interfere with the observations. For city dwellers a practice blackout would also be most acceptable as it would remove the disturbing presence of city lights. The Perseids are seen in greatest numbers after midnight, and the average number of meteors to be expected is about 50 an hour.

A most remarkable event in August is the close conjunction of the planets Mercury and Mars on August 19, so close as to be almost an occultation of Mars by Mercury at the exact time of conjunction, which should occur shortly after sunset in the central part of the United States. Both planets are too close to the sun to be seen without the aid of binoculars or a small telescope, but with such aid it might be possible to observe this remarkable conjunction.

It may be possible to find Mercury in the evening twilight toward the end of August as it is approaching eastern elongation, which will occur on September 15.

Venus is a conspicuous object in the morning sky in August but is drawing nearer to the sun. By the end of September it will be too close to the eastern horizon to be seen unless one has a clear view of the horizon. Jupiter will be in conjunction with Venus on August 2. This will be a beautiful phenomenon to observe as the two planets will be so close as to appear as a magnificent double star. Jupiter will be conspicuous in the eastern sky before sunrise during these two months. Mars will be too close to the sun to be observable after the early part of August. It will be in conjunction with the sun early in October. Saturn is a fine object in the morning sky these two months. It is in the constellation of Taurus, a few degrees nearly due north of Aldebaran, changing its position very slowly during this two month period. Its pale yellow color contrasts strongly with the deep red color of Aldebaran. On September 5 it will be in quadrature and on the meridian at sunrise. It surpasses Aldebaran noticeably in brightness.

On September 23 at 12:17 P.M., Eastern War Time, the sun will cross the equator going south. Fall will begin in the northern hemisphere and spring in the southern hemisphere.

THE CONY'S CHALLENGE

(Continued from page 355)

fragrant papaya juice. Pausing for but one ladylike sniff, she gave the finger a truly painful bite. My hand trembled, but only from a fast-beating pulse, for, climaxing many months of mountain hiking, uncomfortable rock-sitting, wheedling with expensive food, acres of wasted film, a wild cony was ready to eat from my hand.

Within the week Darlene was climbing into my hand. In another week, perhaps craving affection, she permitted my caressing finger to stroke the fur on her back. She looked at me with trust and friendly interest. A spirit of camaraderie existed—at least in my imagination. With Darlene in my hand, my other hand was extended to arm's length to operate the camera, usually at a shutter speed of 1/500 of a second.

That camera remained a fearsome object to the very last day. Darlene never once failed to dart into her fortress at sound of the shutter click. I doubt whether Darlene would have ventured into my hand, had I not prepared a smooth runway for her retreat. It led from the main feeding rock directly into a rock crevice—clear for a quick getaway. Also, all through the lengthy campaign I made it a point to appear in the same hat, jacket and pants. Consequently she instantly recognized me on every occasion.

Many times I thought that I might be doing things the hard way; that perhaps another region could be found where conies were at ease, and their enemies less numerous. However, Darlene had early infatuated me. The reward was all in the game; in the uncertainty of the outcome. But there came the day when my plans changed abruptly. Two scraps of paper, one bearing a brutally frank notation, "insufficient funds," came to hand. I must leave the high mountains and prepare to make a living in the lowlands. In due time that was taken care of. I had written Hank Gordon that my rock-sitting had long since equalled and passed the endurance and determination of a jackass. Also, that I feared cerebral fermentation had set in, perhaps the result of incessantly emulating Rodin's "Thinker." However, no inkling was given that I was prepared to collect.

At long last we met; I, assuming the mask of a disillusioned man, according to plan, greeted Hank rather shamefacedly. He offered a sympathetic hand, which I shook listlessly.

"Hank," I said, "I want you to shake my *left hand.*" He did, with mock ceremony. "That," I declared in triumph, "is *the hand that held a bona fide, wild, living and breathing cony!*"

Fumbling fingers unwrapped a parcel. Then, to complete my grandiose gesture, I rubbed the precious cony photos under his nose. Hank Gordon was "knocked for a loop." I have a new jackknife.

More Shells

We are pleased to report the publication of the fourth and fifth numbers of *Johnsonia,* the publication of the Department of Mollusks of the Museum of Comparative Zoology, Harvard University. Number Four deals with the genera *Tectarius* and *Echininus,* and Number Five with *Cerithidea* and *Batillaria.* Subscriptions to this publication are three dollars a year and should be sent to W. J. Clench at the Museum. The previous numbers may be secured to make the valuable material on shells complete. The next issue will deal, if plans mature, with the interesting genus, *Conus.*

Fellowships

The American Nature Association announces the reestablishment of graduate fellowships at Cornell University designed to improve the leadership in conservation and Nature education. Persons interested and qualified are ordinarily, but not always, candidates for the degree of doctor of philosophy. They should be well trained in the fields of natural science and conservation and should have completed at least one year of graduate work. Teaching experience is desired but not necessary. Appointments for the year 1942-43 will be made early in August. Applications should be sent promptly to Professor E. Laurence Palmer, Graduate School, Cornell University, Ithaca, New York.

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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 369)

cash crops. "Ever since I've been living in Sallisaw," he said, "I've been telling these farmers that if they'd raise stuff to eat instead of cotton, they'd get along better." So he made for himself the chance to prove that he was right, and till the time of his death he ran his demonstration farm during the week and on Sundays told his congregations that gullies are "the work of the Devil." "This is God's earth," he declared from his pulpits, "and you are sinning and desecrating His land when you plow up and down hill." And at his own table he proved that a man could farm righteously and eat in bounty from his own land without regard to the market for cotton.

On a thesis that is much similar to Old McDonald's, Elmer T. Peterson has written a thought-provoking exposition of the modern American "farm problem" and also with a touch of evangelism has called it *Forward to the Land*. Impressed by the volume, J. N. Darling says in a foreword: "Anyone who 'lists to Nature's teachings' must be impressed by the primitive and timeless wisdom of those who have lived long and thoughtfully, in harmony with the unalterable facts of Nature. In this extremely critical period in history, when man's artificial institutions are threatened and we are face to face with primitive facts, the stark problem of food, shelter, and clothing takes precedence over all man-made devices. Here lies the nucleus and dynamic point of true and comprehensive conservation of the land and its fruits." With many facts based on his documentary searchings and many incidents noted in his travels among farmers, Mr. Peterson advances the "crops to eat" gospel that Old McDonald preached.

"The nub of the present problem," he concludes, "is the conflict between moneyways and soilways . . . live-at-home farming. The former lends itself to politics, regimentation, maladjustment, unbalance, skimming the cream of the soil, clinging to an outmoded marketing formula, destructive mechanization, cash cropping, malnutrition, quick profit, erosion, and general waste of resources. The latter lends itself to individual free enterprise, preservation of 'the American way,' decentralization, constructive mechanization, utilization of the low-price-and-high-living-standard principle, adequate nutrition, intelligent and forehanded land use, and the adoption of an extremely important cushion against depression cycles."

How nearly right Mr. Peterson is in dealing with the national economic agricultural problem I am unable to say, but I am impressed with the evidence that he has assembled and feel that his book merits careful reading. Those who feel their best in the outdoors will, I expect, have an increasing interest in such works as these—books that point the way to country living at a time when far travels to the wilderness are more difficult. Though dealing with the choice between cash-crop and subsistence farming, Mr. Peterson's argument and to a great extent Angus McDonald's demonstration may also be pertinent to a choice between urban living and the commuter's farm-to-eat way of life. At a time when the enjoyment of the outdoors may be limited to the region about home, many will be tempted more strongly than ever to move the home to regions of the outdoors and, at a time of increasing food prices, to raise what crops they can. Such concerns added to a fundamental interest in agriculture make these books of immediate interest to the readers of this magazine, though many may find practical uses limited, like mine at present, to a suburban study of Mr. Coulter's excellent volume on gardening.

For Picknickers

The Picnic Book. By Clark L. Fredrikson. New York. 1942. A. S. Barnes and Company. 128 pages. $1.25.

We had never thought that the subject of picnics would provide material for a book, but that such is justified seems amply proved by this volume, which was prepared for the National Recreation Association. Its concern, of course, is with picnics on a large scale, or at least more than the little family jaunt to the woods. The book deals with the planning and preparation of the large picnic, with the program; outings in rural communities; games, stunts and contests; special occasions out of doors; food and its preparation; fires and fireplaces. It is a complete and helpful book.

For School Gardeners

Elementary Garden-Graphs. By Paul R. Young. Pleasantville, New York. 1942. Garden Reviews, Inc. Single copy $.50, with lower prices for quantity orders.

Elementary gardening is today a widespread and growing school activity. In many cases teachers have been confronted with a lack of organized material particularly adapted to productive and effective work with young people. This booklet is designed to meet that situation. Related to it is a Teacher's Manual containing suggestions for organizing and conducting the school gardening projects. This Manual is sent free with each order of twenty-five or more copies of *Garden-Graphs*, or may be purchased for twenty-five cents.

Science Year Book

Science Year Book of 1942. By John D. Ratcliff. New York. 1942. Doubleday, Doran and Co. 279 pages. $2.50.

Science is in the saddle, at the moment rattling its sabre. Articles on scientific achievement are found regularly in most popular magazines. The reading public is reasonably well-informed on the superficialities of things scientific from atoms to vitamins. There will be much public interest, therefore, in this book, ably assembled from popular writings on science during the past year. The author provides an interesting foreword charting some of the avenues for future travel and forecasting great contributions when the man of science is able to turn from the arts of war to the ways of peace. The material collected covers notable developments in the fields of physics, chemistry, medical research, applied science and invention, and agriculture.

Military Birdmen

Ornithologists of the United States Army Medical Corps. By Edgar Erskine Hume. Baltimore. 1942. The Johns Hopkins Press. 583 pages. Illustrated. $5.00.

To those who know birds the names of Cooper, Heermann, Coues, Bendire and Mearns are familiar, and possibly the majority realize that these men were also surgeons in the United States Army Medical Corps. Their travels and their varied posts, often in pioneer country, afforded them opportunity to make their significant contributions to ornithology. But besides these more famous names there were others similarly in the service of their country and, at the same time, serving scientific knowledge. With the more famous quintet mentioned above, thirty-one other Army medical men are the subject of this splendid specialized biographical work by Colonel Hume, himself of the Medical Corps. From far-flung sources the author has gathered his information to make a volume of outstanding permanent value. It is published as the first in a series of monographs of the Institute of the History of Medicine of the Johns Hopkins University. It is gratifying, indeed, that the ornithologists among medical men of the Army should be chosen for the first volume. Colonel Hume has placed bird enthusiasts in his debt, and has established a high standard of research and result for the monographs to follow.

Some Little Fishes

Twenty Little Fishes. By Ida M. Mellen. New York. 1942. Julian Messner. 54 pages. Illustrated by Else Bostlemann. $2.00.

This is a charming book for the younger readers. It deals popularly and entertainingly with twenty fishes, six of them found in the large aquarium, four in the natural pond, six in the aquarium of the fish fancier, and four at the seashore. The author was for many years with the New York Aquarium and writes of the fishes with both authority and charm. The illustrator is widely known for her marine drawings. The combination makes a splendid gift book for the quite younger set.

Nature Guide

Leader's Nature Guide. By Marie E. Gaudette. New York. 1942. Girl Scouts, Inc. 94 pages. Illustrated with line drawings. $.35.

Written by the Nature Adviser of the Girl Scouts, this valuable little booklet is, of course, designed for Scout use. However, it will be valuable to anyone working with young people in Nature study, whether as teacher, camp counsellor, informal group leader or otherwise. The booklet carries a sub-title—"How to Do Nature before She Does You"—which, we confess, we find a little cryptic. The text does not seem to interpret this, but it certainly interprets Nature and its significance. Miss Gaudette has made a most valuable contribution to Nature leadership, provided many practical suggestions, given many valuable references to source material. We trust this guide receives the wide use to which it is entitled.

Famous Physicists

Portraits of Famous Physicists. By Henry Crew, New York, 1942. Scripta Mathematica. Portfolio of pictures with accompanying biographical accounts. $3.75.

This fine portfolio is one in the series of Pictorial Mathematics publications. It originated with the appointment of a committee to select twelve from the group of more than fifty outstanding physicists of the past. Those finally chosen were Galileo, Huygens, Newton, Ampère, Fresnel, Faraday, Joule, Clausius, Maxwell, Gibbs, Hertz and Rowland. Mr. Crew, a member of the committee, was designated to write the biographies, each within a limit of eight hundred words. This was no simple task, for the rich and varied lives of these men are difficult to compress into so small a space. Mr. Crew has succeeded splendidly in these brief life stories. Each is accompanied by fine reproductions of pictures of each of the twelve. Not the least outstanding feature of this portfolio, certainly, is the notable typographical treatment and press work that the publishers have given it. A splendid project for a high school physics club would be to purchase this portfolio and have each picture, and the accompanying biography, framed and hung as a frieze in the physics classroom. At least, no high school library should be without the portfolio.

California Geology

Adventures in Scenery. By Daniel E. Willard. Lancaster, Pa. 1942. The Jaques Cattell Press. 438 pages. Illustrated. $3.75.

This book carries the sub-title, "A Popular Reader of California Geology", and it is just that. The author has gathered from a wide variety of sources, and from the studies of specialists, the facts of California's geological past and present. He has delved into what has made the scenery of the Golden State what it is. Finally, he has presented these facts as simply as possible so that they may be interesting and informative to the lay reader and to the student. Geology, a very live subject, has too often been burdened by too much scientific verbiage that is useful and intelligible only to the specialist. Mr. Willard set out in his book to avoid this discouragement to the layman, and has succeeded admirably. An excellent glossary defines essential scientific terminology, and a bibliography provides references for anyone who may wish to follow certain avenues of geological study further. This is the sort of book that makes scenery significant to the beholder and geology significant to the lover of the outdoors.

A Dixie Garden

A Southern Garden. By Elizabeth Lawrence. Chapel Hill. 1942. University of North Carolina Press. 241 pages. $3.00.

The problems and the opportunities for those who garden in the middle South differ from those in other parts of the country. While the winter may be fairly severe, it is usually short, cold weather claiming only about two months of the year. Thus there is a period of short garden rest and a long period of awakening and bloom. How to plan the southern garden to take advantage of this condition and to have a continuously-blooming garden plot is one of the objects of this book. It is packed with information, although more on the species and their effects in the garden than on cultural directions.

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Songs of the Open

Words and Music by GRACE KEIR

Girl Scout Naturalist

With illustrations by R. B. Horsfall

THE STUDY OF NATURE MADE EXCITING THROUGH TUNEFUL SONGS. Well aware of how children rebel at the word "study," Grace Keir has presented her book in a manner which does not make it too evident to the child that *while singing* he is actually learning the essentials in natural history.

Her verses are about animals, insects, birds, flowers, and trees—their characteristics and habits. Life-like pictures illustrate the work, giving it added attraction and interest. The book contains, also, a nature pageant entitled "The Growth of Columbine." The music is simple—the songs catchy. Can be used with or without piano.

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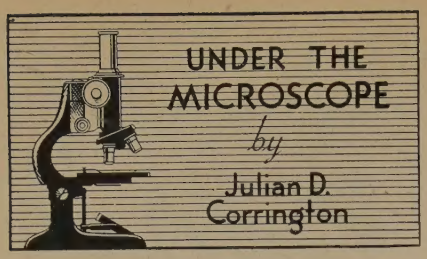


MOLDY BREAD

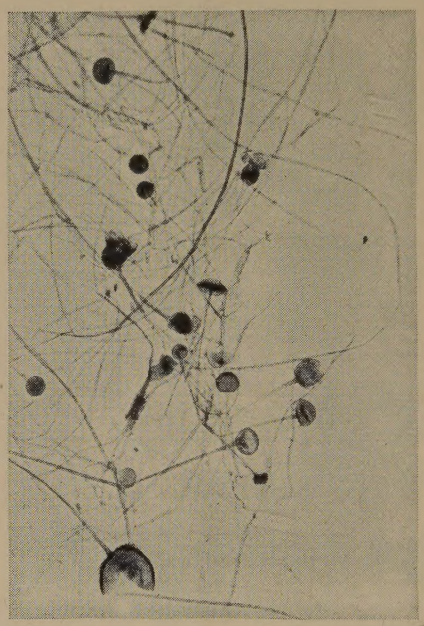
Among lower plants favored as objects of study by the microscopist, much attention is paid to the several groups known as molds and mildews. Since these are quite minute in size the microscope is required for all phases of their study, whether dealing with structure, function, or life history. In selecting this for our present subject we are also introducing the chronic reader of this Department to two important modern sciences; mycology, or the study of fungi, and plant pathology, the science of plant diseases, in which the fungi play a prominent part.

For the beginner in this field, some orientation is necessary. Plants are first of all divided into four great divisions, the lowest of which is the Thallophyta; thallophytes have no true root, stem, or leaf, nor do they have vascular tissue, by which is meant a system of vessels or tubes for distribution of water and nutrients. The thallus or plant body may be a single cell or, in the multicellular forms, consist of filaments, plates, or masses of simple, relatively undifferentiated cells. Two subdivisions occur, the algae and fungi, the former including the pond scums, diatoms, seaweeds and their allies, in which the presence of chlorophyll, the coloring matter of green plants, enables them to manufacture their own food, as is typical of plants in general. The process is referred to as autophytic or holophytic nutrition.

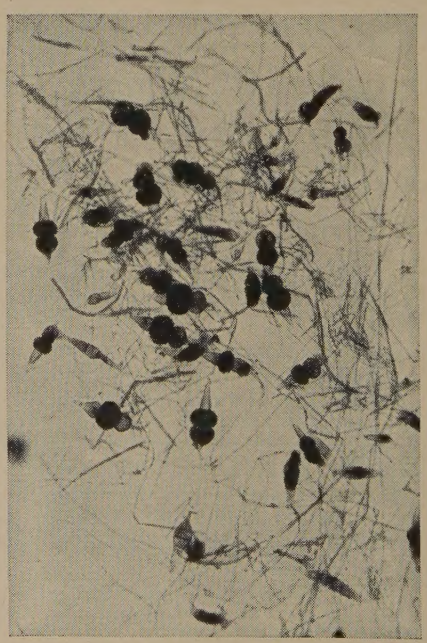
The fungi (singular fungus, adjective fungous), however, lack chlorophyll and so must draw their nourishment from dead or decomposed organic matter (saprophytic nutrition), or by attacking living organisms, plant or animal (parasitic nutrition). Some sixty thousand species are known, from every conceivable environment, and the number of individuals doubtless far exceeds that of all other organisms combined. Many fungi, as bacteria, are single-celled; others are multicellular, the organization being in the form of filaments or threads termed *hyphae* (singular, hypha). The whole mass of hyphae making up the body of a single such plant (i.e., germinating from a single spore) is the *mycelium,* and this frequently appears as a tangled meshwork of fine cobwebby threads buried in the soil or other *substrate*—the material on or in which the fungus grows—and is seldom seen unless carefully searched for. Everyone is familiar with common mushrooms, for example, but many are unaware that the part visible above ground is but the fruiting body of the plant, the mycelium of which ramifies through the soil.

The fungi, in turn, are separated into a number of classes, five being recognized by many mycologists—the botanists who specialize in this group. These are the Schizomycetes (fission fungi) or bacteria, the Phycomycetes (alga-like fungi) or tube fungi, the Ascomycetes (ascus fungi) or sac fungi, the Basidiomycetes (basidium fungi), a group including the mushrooms, and the Myxomycetes (slime fungi, slime molds), often claimed by the zoologist as animals, under the designation Mycetozoa.

The many problems, both biological and medical, associated with the bacteria are so involved and important that the group is customarily dealt with separately in one of today's most vital sciences, bacteriology. We have already devoted a series of three installments to a preliminary survey of this subject in the issues of December, 1939, January and February, 1940. While some bacteria constitute one of the most widespread and abundant of all types of enemies of man and his goods, there are other fungi no less serious as pests and these have won for themselves such very descriptive and opprobrious titles as molds, mildews, blights, rots, knots, cankers, rusts, bunts, smuts, and the like. The sound of these words conjures up pictures of death, destruction, and decay. Mostly they are farmer's names of long standing and have little relation to classification. Thus the name mold has been given to a variety of unlike fungi simply because the infestation resembles a fine fuzz and is accompanied by a slow destruction of the invaded material.



Mycelium and sporangia of *Mucor,* a bread mold (above) and zygospore formation between plus and minus strains of *Rhizopus nigricans.* Slides courtesy Ward's Natural Science Establishment, Inc.



One of the best known, most widely distributed, and easily studied of molds is *Rhizopus nigricans,* black mold, or bread mold. If a freshly-cut piece of bread is exposed to the air for thirty minutes in practically any situation at all, and is then slightly moistened, put under a bell jar, and kept in a warm location, this mold will appear, often accompanied by growths also of other species having characteristic colors, as blue, green, or pink. Where do these destructive saprophytes come from and how do they get at the bread?

Highly microscopic asexual spores of molds float in the air all about us, along with those of other fungi, and with bacteria, pollen, and other organic components of dust. Some of the *Rhizopus* spores will fall upon the slice of bread when this is exposed, and will germinate if warmth and moisture are provided. In our own climate we have to keep bread in the refrigerator all summer to preserve it from this ubiquitous pest. Germination produces hyphae which soon form a weft of mycelium covering large areas. Root-like structures called *rhizoids* are developed here and there to penetrate the substrate and furnish the rest of the plant with food, water, and mineral salts, transforming bread into fungous substance. The nodes where rhizoids are present are connected in several directions with others by means of runners or *stolons,* somewhat like those of the strawberry plant in general appearance.

Black mold belongs to the Phycomycetes, a group containing some 500 species. In most of these, including *Rhizopus,* the hyphae are tubular and branching, without cross walls dividing them into cells. Any given portion of a hypha contains numerous nuclei; such an arrangement, with areas of multinucleate, non-cellular protoplasm is known as *coenocytic* (common cells). The mycelium as thus described is the vegetative plant, the function of which is to attain sufficient strength and size so as to form the reproductive structures.

Both asexual and sexual reproduction occur in these molds. At the nodes where rhizoids are present, groups of hyphae extend vertically upward, above the substrate, each terminating in a bulbous enlargement. Such a hypha is a *sporangiophore* (sporangium-bearer), while the enlarged tip is a *sporangium* (spore case). The sporangium grows and matures, then by rupture liberates hundreds of exceedingly minute black spores; these make the mature sporangium appear black too, hence the name of black mold. The spores are designated as *sporangiospores* in order to differentiate them from other types, as conidiospores, zygospores, and others to be described later.

These spores float away in the atmosphere, to germinate elsewhere. Now and again, as one grows this species on moist bread, there appear short, conical, lateral branches from two adjacent hyphae, that grow toward each other and meet. The protoplasm at the tip of each such branch is dense and contains a great many nuclei, appearing darker in hue than general mycelium. The darkened

tip then constricts off as a single cell, the *gametangium,* the contained protoplasm being a *gamete* (sex cell). Upon breaking down of the intervening walls between the two contiguous gametes, they fuse to form a *zygote* (fusion cell) and, as time passes, the outer wall of the zygote becomes enlarged, very black, and warty, the structure being then termed a *zygospore.* In *Rhizopus* germination of this spore is unknown; for some reason it does not mature. In related species, however, the zygospore goes through a period of rest and maturity, then germinates to form a sporangiophore, which in turn produces asexual sporangiospores. The zygospore is normally very resistant and may serve to tide the organism over unfavorable periods as well as to bring together the protoplasm of two separate individuals.

Conjugation of the two gametes thus has within it the essentials of sexual reproduction, and some authors have even referred to the two participants as male and female. The two gametes are indistinguishable, and accordingly the species is said to be isogamous (like or equal gametes); there is no differentiation into sperm and egg as with *heterogamous* (unlike gametes) forms.

Early investigators were puzzled by the occurrence of conjugation in *Rhizopus.* In a given culture zygospores might form readily, while in another they might not form at all, and there seemed to be no laboratory conditions with respect to temperature, moisture, food, or other factors that had any influence. In 1904 Professor A. F. Blakeslee published a paper entitled *Sexual Reproduction in the Mucorineae* and was the first to show that there are two kinds of sporangiospores, each germinating to form a separate race or strain of mycelium, termed plus and minus, analogous to male and female. Conjugation will take place only between a plus and a minus hypha, hence if the mycelium on a piece of bread has all been derived from a single spore, or from several spores of the same variety, no sexual reproduction can occur. It is necessary that at least two spores, one from the plus race and the other from the minus race, fall upon the same substrate and germinate in proximity to each other. *Rhizopus* is accordingly said to be *heterothallic,* whereas many other molds are *homothallic,* conjugation taking place between neighboring portions of the same mycelium.

The difference between the two strains of mycelium or the two spores in *Rhizopus* cannot be detected visually; they are morphologically identical as far as known, but are physiologically distinct. The microscopist who wishes to produce zygospores must keep two different strains of mycelium, each discovered by trial and error experiment. All large university laboratories today have pedigreed stocks of both plus and minus mold.

The two slide preparations commonly made are illustrated by our accompanying micrographs, and the technique considered in a separate article next month.

BEGINNER'S PRIMER

The Order Dermaptera (skin-wing) is a small and compact one, containing only the earwigs, so-called because of an old superstition that these insects crept into the ears of sleeping persons. The antennae are filiform, long, and prominent; the body elongate and slender; the mouthparts formed for chewing; and the metamorphosis incomplete. Most characteristic are the wings and a pair of caudal appendages at the end of the abdomen, the cerci, resembling a forceps.

The forewings are hardened wing-cases or elytra, shiny and devoid of veining. Such elytra are found only in beetles and earwigs, and the latter may be told at once from beetles, as well as from all other insects, by the forceps. The hind wings of earwigs are generally rounded, and when at rest are folded into numerous fan-like pleats and also twice folded transversely. The elytra are short and do not conceal all of the second wings or the abdomen, in this respect resembling rove beetles. A number of species are wingless.

A great deal has been written on the supposed functions of the forceps, but it seems definitely established now that at least some species, if not all, use them for defense, for killing prey, and to a certain extent for folding and unfolding the hind wings. These cerci are larger in males than in females, and are often notched, toothed, or otherwise distinctively formed.

Earwigs vary from small to medium in size and are nocturnal, shunning the light. Most temperate zone species are herbivorous, while in the tropics carnivorous forms predominate. Many are omnivorous scavengers. Daytimes they seek all sorts of crannies and secluded places in which to hide, such as cracks in the soil, crevices in bark, and beneath rocks, boards, trash, leaves, and manure piles. Parental care of the eggs and young has been frequently observed.

Species are not numerous in the United States. They are more plentiful toward the South and the Pacific Coast than elsewhere, but our commonest forms everywhere are introduced species that have come over in ship cargoes. The European earwig, the form that has been most studied, is *Forficula auricularia,* a shiny brown or black fellow about 12 mm. long, and winged. It is often a serious house and garden pest and may breed in vast numbers in manure heaps or piles of decaying vegetation, as trash heaps, lawn cuttings, or garbage dumps.

Labia minor, the small earwig, is 5 mm. in length, reddish-brown to black, winged, and has been introduced to all coastal regions of the United States and is the only species of the order found in Canada. The seaside earwig, *Anisolabis maritima,* is a dark brown wingless species, 20 mm. long, with lighter colored legs, and has been introduced to both coasts of our country. It dwells under debris on ocean beaches, just above highwater mark.

Earwigs make attractive whole mounts, especially such small forms as *Labia minor.* The hind wings and forceps are likewise noteworthy subjects as mounts of parts, while the antennae and mouthparts also deserve attention. The darkly-pigmented insects or parts should be bleached or potashed before mounting.

With this chapter we have concluded a brief survey of all main groups save those major orders having a complete metamorphosis—the Holometabola. Thus while we are much more than halfway through the list of principal insect orders, we are far less than halfway with the families, genera and species. All those larger, conspicuous, well-known, and economically important groups comprised in the beetles, butterflies and moths, flies, fleas, ants, bees, wasps and a few others remain to be considered in future installments.

Background for the Microscope

Equipment for the pursuit of microscopy may be as simple or as elaborate as individual inclinations dictate; but there is one item wholly indispensable —*books!* The microscope is handmaiden to all the sciences, and those who follow its adventuresome trail must have many a guide to direct along the right path.

Here is NATURE MAGAZINE'S selection of best bets. Check your library and add those who fail to answer the roll call. Buy one each month, or as often as you can. Suggest them as gifts. Buy them for the relative or friend whose chief joy is working with his microscope. Entries will be changed periodically; here is a basic list for a starter:—

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The Microscope, by S. H. Gage; 17th ed., most celebrated American work; very thorough.....$4.00

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Working with the Microscope, by J. D. Corrington; New guide for self help or classroom with graded series of lessons, from single to advanced. $3.50

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TECHNIQUE TIP

In affixing portions of paraffin ribbons to slides, following sectioning, the usual method is to smear the slide lightly with such an affixative as Mayer's albumen or Szomdathy's glycerin-gelatin, flood the slide with water, then float one or more sections on the water and heat the slide gently. The sections flatten out smoothly and are drawn down into the affixative as the water evaporates. Some technicians prefer an alternative procedure. They float relatively long pieces of the ribbon on the surface of a large bowl of warm water, where the sections spread out nicely. Individual sections are then transferred to prepared slides.

TRADE NOTES

An essential item in the botanist's library is Professor Raymond J. Pool's *Flowers and Flowering Plants,* the subtitle of which gives a very good idea of the contents: An Introduction to the Nature and Work of Flowers and the Classification of Flowering Plants. Following a broad preliminary survey of the subject, there are chapters on the structure, work, forms, and clusters of flowers, on fruits and seeds, migration, floral diagrams and formulae, vegetative parts, principles of classification, 31 main orders, history, collecting and preparing specimens, literature, glossary, and index.

The second edition has been improved by addition of the chapter on vegetative characteristics of flowering plants, taking up roots, stems, and leaves, and the glossary, while the large chart outlining the classification of about one hundred families has been completely revised and made more useful by including drawings. All of the illustrations are very well done and highly useful. We detected certain examples of faulty editing and proofreading which need ironing out, but this has nothing to do with the usefulness of the book, which is very high. If you are at all concerned with the subject, this is a must book, excellent for classroom, self instruction, or reference. Pp. xxiii, 428; frontisp., chart, figs. 211. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, 1941. $3.50.

A new textbook of entomology makes news; they don't come off the presses every month. *College Entomology* by E. O. Essig, professor of the subject at the University of California, will be welcomed by those who require, for teaching, personal use, or reference, a very thorough and complete text and manual combined. The book is documented, compendious, detailed, advanced, and is not for juvenile enthusiasts or beginners.

Three introductory chapters take up metamorphosis, anatomy, and classification of insects, followed by one each for thirty-three orders, general references, author index, and subject index. With each order there is a synoptical arrangement of both external and internal features that is an immense time saver in reference work, a consideration of both fossil and living species, prominent forms from all zoogeographic regions of the world, the natural history of important species, keys for identification, mention of chief genera and species, and a selected list of references.

The etymology, sources, authorities, dates, synonyms, and foreign language equivalents are given for group names. It does not appear that the author has omitted any fact one would need to look up; the amount of condensed information is encyclopædic and truly amazing. Most of the illustrations are new and all of them excellent, adding much to the usefulness and attractiveness of the volume. Pp. vii, 900; colored zoogeographic map, frontisp., figs. 308. The Macmillan Co., 60 Fifth Ave., New York City, 1942. $5.00.

A fourth edition, revised, has appeared of that very important text on human embryology, the *Developmental Anatomy* of Leslie Brainerd Arey, Northwestern University, widely used in medical schools throughout the country. For those unfamiliar with this work it may be stated that the text is advanced, very thorough and complete, and splendidly illustrated, many of the plates being in color. In general, Dr. Arey's book takes up where the more usual elementary, liberal arts college type of book leaves off. Following an introductory chapter, there is one on the germ cells and their formation, one on cleavage and the germ layers, a fourth on the fetal membranes, and from then on the bulk of the volume is concerned with the human subject, taking up the development of all tissues and organs in great detail. The chapter on teratology is one of the best available references on this subject, while with each succeeding organ full treatment of normal formation is followed by condensed descriptions of the known monstrous and pathological cases. Each chapter has its list of cited references. Part III is a highly useful and fully illustrated laboratory manual on chick and pig embryology.

The fourth edition has been so extensively rewritten that it is virtually a new book, while 540 new illustrations have been added and many of the others redrawn and improved. The laboratory manual has also been completely recast. The author has combined functional with structural aspects and presents the material as a graphic and fascinating story; no fiction ever will compare with the tale of the coming into being of that most complex af all machines—the human body—and the author does not overlook the dramatic possibilities, writing with interest as well as distinction—condensed but never dehydrated. Pp. ix, 612; figs. 588. W. B. Saunders Co., West Washington Square, Philadelphia, 1942. $6.75.

Do you have a victory garden? Raising your own vegetables is more popular and important than ever now, so a third edition of Professor Knott's *Vegetable Growing* is timely and should be well received. This is a smallish volume packed with practical information, a feature that will commend the book to busy people. While intended primarily as a text for a college course in the subject, it is equally suited to the private grower or the commercial truck farmer. The first fifteen chapters deal with generalities, applicable to a wide variety of plants, the next eleven with specific crops, and the last with marketing.

All of the factors affecting plant growth are concisely explained, with detailed attention to soils, fertilizing, cropping, pests, and the production of plants, together with full explanations of methods, such as forcing, and the use of cold frames, flats, and other aids. Classifications, tables, references, and illustrations are used liberally. Pp. 356, figs. 80. Lea & Febiger, Washington Square, Philadelphia, 1941. $3.25.

The electron microscope has received a great deal of attention in the press and with popular magazine articles in the past few years; our own report on this remarkable new development appeared in this Department for February, 1941. Now comes the first full work on the subject written for the layman, *The Electron Microscope,* by E. F. Burton and W. H. Kohl, men who have had much to do with research and applied work on the new device. Approximately half of the book deals with elementary optical principles of the light microscope and comparisons with electron optics, giving a very good historical survey of man's knowledge of light and how it can be controlled and utilized. Most of the illustrative diagrams are good and make the points of the text clear. For these reasons alone, the volume will be valuable as a first course in optics for beginners in microscopy.

In the second half, concerned primarily with electricity, magnetism, the two kinds of electron microscopes, and their history and applications, the first explanations are done in a manner understandable to those not specializing in advanced mathematics or physics, but some of the later material becomes rather involved. Certain of the diagrams are none too clear and a few suffer from lack of close coordination with the text. There is need for better proofreading here and there and some of the light micrographs, inserted mainly for comparison with electron micrographs and to illustrate such points as resolution and numerical aperture, are far from representing the best work obtainable. The lay reader is likewise struck with the meagerness of the information which this new invention has thus far added to our knowledge, especially in the biological field, though since electron microscopes are presumably in their infancy, too much should not be expected at first.

These criticisms are minor in comparison with the very real merits of this book and the service it performs in making understandable the bulk of a difficult subject. It is therefore recommended to our readers as a valuable addition to their technical libraries. Pp. 233; figs. 110; 85 unnumbered illustrations. Reinhold Pub. Corpn., 330 W. 42nd St., New York, 1942. $3.85.

A very fine and entirely new botany has appeared, the work of Paul Weatherwax, Professor of Botany at Indiana University, entitled *Plant Biology.* The book is designed primarily for a one-semester course in college botany, or for half of the year course in general biology; incidentally it is one of the best we have read for use by the layman or independent worker who wishes a foundation in plant biology. It is unusually well written and interesting, excellent in content and organization, and beautifully illustrated, almost wholly with new drawings and photographs by the author.

Condensation and simplicity are keynotes of this book, which begins with description of a simple plant; proceeds through cytology and general physiology to plant parts and their work; then takes up growth, responses to stimuli, and reproduction; goes on to heredity, classification, plant divisions, evolution, pollination, dormancy and dispersal; and ends with a chapter on migration, communities, and succession. A splendid, complete, and very readable survey is thus provided, with essential but no undue emphasis on technicalities; suited to the beginning student who will take no further work in the subject as well as for the embryo specialist. Pp. vi, 455; figs. 182, containing 417 illustrations. W. B. Saunders Co., West Washington Square, Philadelphia, 1942. $3.25.